Dell™ PowerEdge™ C2100 Systems

Hardware Owner's Manual

Regulatory Model FS12-TY

Notes, Cautions, and Warnings

NOTE: A NOTE indicates important information that helps you make better use of your computer.

CAUTION: A CAUTION indicates potential damage to hardware or loss of data if instructions are not followed.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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Regulatory Model FS12-TY

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Contents

1 About Your System 9

Accessing System Features During Startup 9

Front-Panel Features and Indicators 10

Hard-Drive Indicator Patterns 12

Back-Panel Features and Indicators 13

NIC Indicator Codes 14

Power and System Board Indicator Codes 16

Collecting System Event Log for Investigation 17

POST Error Codes 17

Beep Codes 29

Post Beep Codes 30

Other Information You May Need 31

2 Using the System Setup Program 33

Start Menu 33

System Setup Options at Boot 34

Console Redirection 34

Main Menu 34

Main Screen 35
AMIBIOS Settings. 36
Processor Settings 36
System Memory Settings 36

Advanced Menu **36**
Processor Configuration 37
Memory Configuration 38
IDE Configuration 38
Super IO Configuration 39
USB Configuration 39
PCI Configuration 39

Boot Menu **41**
Boot Settings Configuration 41

Server Menu **43**
iBMC LAN Configuration 44
Remote Access Configuration 45

Security Menu **46**

Exit Menu. **46**

3 Installing System Components 47

Safety Instructions **47**

Recommended Tools **47**

Inside the System. **48**

Hard Drives. **49**
Removing a Hard-Drive Blank 50
Installing a Hard-Drive Blank 50
Removing a Hard Drive From a Hard-Drive Carrier. 50

Installing a Hard Drive Into a Hard-Drive Carrier . 51
Removing a Hard-Drive Carrier. 52
Installing a Hard-Drive Carrier 52
Removing the Optional Internal Hard Drive 53
Installing the Optional Internal Hard Drive 54

Opening and Closing the System **54**
Opening the System 54
Closing the System 55

Cooling Shroud. **56**
Removing the Cooling Shroud 56
Installing the Cooling Shroud. 57

Heat Sinks **58**
Removing the Heat Sink 58
Installing the Heat Sink. 60

Processor **60**
Removing the Processor 60
Installing the Processor 62

System Memory **63**
General Memory Module Installation Guidelines . 63
Mode-Specific Guidelines 64
Supported Memory Configuration 65
Removing Memory Modules 66
Installing Memory Modules 68

Expansion-Card Riser and Expansion Card **69**
Removing the Expansion-Card Riser 69
Installing the Expansion-Card Riser 71
Removing the Expansion Card 72
Installing the Expansion Card 74

Integrated Storage Controller Cards **74**

Removing the Integrated Storage Controller Card . 75
Installing the Integrated Storage Controller Card . 76

RAID Battery (Optional) 77
Removing a RAID Battery 77
Installing a RAID Battery 78

Dual RAID Battery (Optional) 80
Removing a Dual RAID Battery 80
Installing a RAID Battery 82

Mezzanine Card (10 GbE LAN) 83
Removing the Mezzanine Card (10 GbE LAN). . . . 83
Installing the Mezzanine Card (10 GbE LAN) 85

Power Supplies 86
Removing the Power Supply 86
Installing the Power Supply. 87
Removing the Power Supply Blank 88
Installing the Power Supply Blank 88

Power Distribution Board 88
Installing the Power Distribution Board Assembly . 89

Cooling Fans 90
Removing a Cooling Fan Assembly 90
Installing the Cooling Fan Assembly 91
Removing the Fan Module 92
Installing the Fan Module. 92

Backplane 93
Removing the Backplane 93
Installing the Backplane 95

Control Panel Assembly 95
Removing the Control Panel Assembly 95

Installing the Control Panel Assembly 97

System Battery **97**

Removing the System Battery 97

Installing the System Battery 98

System Board **99**

Removing the System Board 99

Installing the System Board 100

4 Troubleshooting Your System 103

Safety First—For You and Your System **103**

Installation Problems **103**

Troubleshooting System Startup Failure **104**

Troubleshooting External Connections **104**

Troubleshooting the Video Subsystem **104**

Troubleshooting a USB Device **104**

Troubleshooting a Serial I/O Device **105**

Troubleshooting a NIC **106**

Troubleshooting a Wet System **107**

Troubleshooting a Damaged System **108**

Troubleshooting the System Battery **108**

Troubleshooting Power Supplies **109**

Troubleshooting System Cooling Problems **110**

Troubleshooting a Fan **110**

Troubleshooting System Memory **111**

Troubleshooting a Hard Drive **113**

Troubleshooting a Storage Controller **114**

Troubleshooting Expansion Cards **115**

Troubleshooting Processors **116**

IRQ Assignment Conflicts **117**

Troubleshooting Changes in BIOS Settings **118**

5 Jumpers and Connectors 119

Jumper Settings **119**

System Configuration Jumper Settings 119

Backplane Jumper Settings **120**

System Board Connectors **121**

Backplane Connectors **123**

Power Distribution Board Connectors **125**

6 Getting Help 127

Contacting Dell **127**

Index 129

1

About Your System

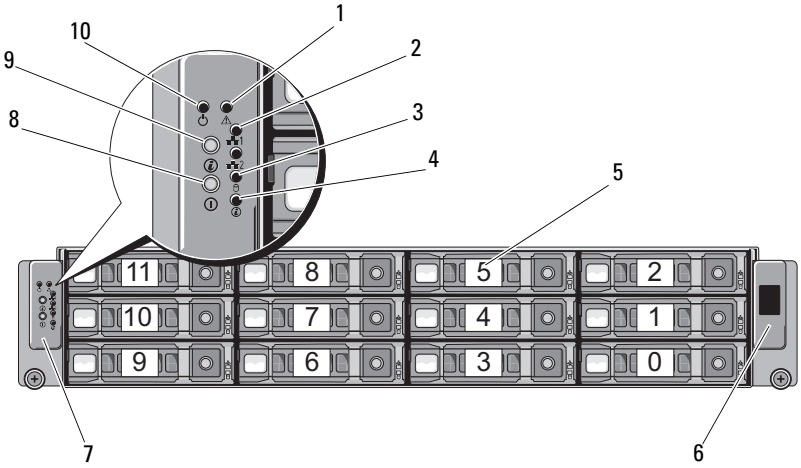
Accessing System Features During Startup

The following keystrokes provide access to system features during startup.

Keystroke	Description
<F2>	Enters the System Setup program. See "Start Menu" on page 37.
<F11>	Enters the BIOS Boot Manager. See "System Setup Options at Boot" on page 38.
<F12>	Starts Preboot eXecution Environment (PXE) boot.
<Ctrl><C>	Enters the SAS Configuration Utility. For more information, see the SAS adapter documentation at **support.dell.com/manuals**.
<Ctrl><R>	Enters the RAID configuration utility. For more information, see the documentation for your SAS RAID card at **support.dell.com/manuals**.
<Ctrl><S>	Enters the utility to configure NIC settings for PXE boot. For more information, see the documentation for your integrated NIC at **support.dell.com/manuals**.

Front-Panel Features and Indicators

Figure 1-1. Front-Panel Features and Indicators



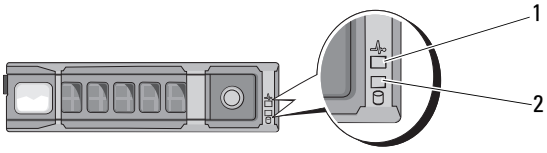
Item	Indicator, Button, or Connector	Icon	Description
1	Fault LED	⚠	Displays status errors and is controlled by the Baseboard Management Controller (iBMC). Blinks amber in the event of a non-critical failure, such as fan, voltage or temperature state.
2	NIC LEDs (2)		Light green when a connection is made to the NIC port, blink when there is traffic on the NIC port.
3	Hard-drive activity LED		Lights green when the hard drives are active.
4	System ID LED		Blinks blue when the ID button is pressed.
5	Hard-drives		Up to twelve hot-swappable 3.5" hard drives.

Item	Indicator, Button, or Connector	Icon	Description
6	LCD panel		Provides system ID, status information, and system error messages. The LCD lights blue during normal system operation. The LCD lights amber when the system needs attention, and the LCD panel displays an error code followed by descriptive text. **NOTE:** If the system is connected to AC power and an error has been detected, the LCD lights amber regardless of whether the system has been powered on.
7	Control panel		Comprises the various LEDs and buttons.
8	Power button		When pressed, turns the system on.
9	System ID button		The identification buttons on the front and back panels can be used to locate a particular system within a rack. When one of these buttons is pushed, the LCD panel on the front and the blue system status indicator on the back blink until one of the buttons is pushed again.

Item	Indicator, Button, or Connector	Icon	Description
10	Power-on indicator		The power-on indicator lights when the system power is on. **NOTE:** When powering on the system, the video monitor can take from several seconds to over 2 minutes to display an image, depending on the amount of memory installed in the system. **NOTE:** On ACPI-compliant operating systems, turning off the system using the power button causes the system to perform a graceful shutdown before power to the system is turned off. **NOTE:** To force an ungraceful shutdown, press and hold the power button for 5 seconds.

Hard-Drive Indicator Patterns

Figure 1-2. Hard-Drive Indicators



1 hard-drive status indicator (green and amber)

2 hard-drive activity indicator (green)

Table 1-1. Hard Drive Indicators—On-Board SATA Ports

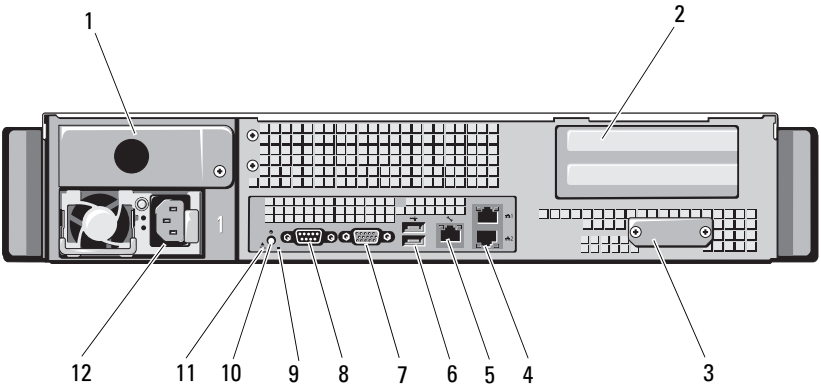
Drive-Status Indicator/Drive-Activity Indicator	Condition
Off/Off	No drive
Steady green/Off	Drive online (no access)
Steady green/Off	Drive is present or in idle stage
Steady green/Blinks green	Drive access

Table 1-2. Hard Drive Indicators—SAS/SATA Add-on Cards

Drive-Status Indicator/Drive-Activity Indicator	Condition
Off/Off	No drive
Steady green/Off	Drive online (no access)
Steady green/Off	Drive is present or in idle stage
Steady green/Blinks green	Drive access
Steady amber/Off	Drive failed
Blinks amber/Steady green	Drive rebuilding

Back-Panel Features and Indicators

Figure 1-3. Back-Panel Features and Indicators

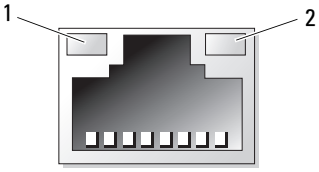


Item	Indicator, Button, or Connector	Icon	Description
1	Slot cover for power supply 2		Your system comes with one single power supply or a set of redundant power supplies.
2	PCIe card slots cover		Accommodate an x8 half-length and a full height card.
3	Mezzanine-card cover		Remove this cover before installing the mezzanine card.
4	Ethernet connectors (2)		Embedded 10/100/1000 NIC connector.
5	KVM over iBMC Port		Dedicated management port.

Item	Indicator, Button, or Connector	Icon	Description
6	USB connectors (2)		Connect USB devices to the system. The ports are USB 2.0-compliant.
7	Video connector		Connects a VGA display to the system.
8	Serial connector		Connects a serial device to the system.
9	Back ID LED		Lights when the system has been selected for identification.
10	System identification indicator		Lights amber when the system needs attention due to a problem.
11	Fault LED		Displays status/errors and is controlled by iBMC.
12	Power supply		750 W

NIC Indicator Codes

Figure 1-4. NIC Indicators



1 link indicator

2 activity indicator

Table 1-3. NIC Speed Indicator Codes

NIC Speed Indicator	Condition
Steady amber	Link at 1 Gbps
Blinks amber	Identifying port with 1 Gbps connection
Steady green	Link at 100 Mbps
Blinks green	Identifying port with 10 Mbps or 100 Mbps connection
Green off	Link at 10 Mbps

Table 1-4. NIC Indicator Codes—iBMC

NIC Indicator	Condition
Steady green	Link LAN/No access
Blinks green	Accessing LAN
Green off	Idle

Table 1-5. NIC Speed Indicator Codes (KVM Over IP Port)

NIC Speed Indicator	Condition
Steady green	Link at 100 Mbps
Green off	Link at 10 Mbps

Power and System Board Status Codes

The LEDs on the system front and back panel display status codes during system startup. All systems share the same LEDs on the front and back panel. Table 1-6 lists the status associated with the codes.

Table 1-6. Power and System Board Indicator Codes

Power-On Indicator	Condition
Steady green, amber off	Power is on.
Green off, blinks amber	iBMC critical condition event in power off mode (S4/S5).
Green, blinks amber	iBMC critical condition event in power on mode (S0/S1).

Table 1-7. System Identification Indicators

System Identification Indicator	Condition
Steady blue	IPMI OEM command is set. Option on Web is chosen.
Blinks blue	**Identify** button is pressed. IPMI chassis Identified command is executed. S3 Mode (4s/1s Interval).
Blinks blue continuously (four seconds on/off	Power event in power standby mode (S3).
Blue off	Turned off by IPMI chassis identify command or ID button press identification off.

Table 1-8. Power Indicator Codes

Power Indicator	Condition
Steady green	Power is on.
Steady yellow	Power supply faulty (UVP/OVP/OCP/SCP/OTP/Fan Fault).

Power Indicator	Condition
Yellow off	Power supply is off or AC input voltage is out of normal operating range (90–264 VAC).
Blinks green	Standby power is on.

Table 1-9. Fault Indicator Codes

Fault Indicator	Condition
Blinks amber	Host has critical or non-critical events detected by iBMC, please check iBMC SEL for details.
Amber off	SEL is cleared or fail symptom has been recovered. This failed LED will be turned off in power off state.

Collecting System Event Log for Investigation

If the front panel LED blinks for 30 to 60 seconds upon applying AC power to the power supply, the baseboard management controller (iBMC) is initializing. If not, then the iBMC is not functioning. If the iBMC is working, try to gather system event log (SEL) information for investigation.

POST Error Codes

Code	Log in iBMC	Error Message	Corrective Action
0000	Yes	Timer Error	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
0003	Yes	CMOS Battery Low	See "Troubleshooting the System Battery" on page 112.

Code	Log in iBMC	Error Message	Corrective Action
0004	Yes	CMOS Settings Wrong	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
0005	Yes	CMOS Checksum Bad	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
000B	Yes	CMOS memory size Wrong	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
000C	Yes	RAM R/W test failed	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
000E	Yes	A: Driver Error	See "Troubleshooting a Hard Drive" on page 117.
000F	Yes	B: Driver Error	See "Troubleshooting a Hard Drive" on page 117.
0012	Yes	CMOS Date/Time Not Set	Remove AC power to the system for 10 seconds and restart the system. See "Troubleshooting the System Battery" on page 112. If the problem persists, see "Getting Help" on page 131.
0015	Yes	USB keyboard not found	See "Getting Help" on page 131.
0016	Yes	POST NO PXE-capable device available	See "Getting Help" on page 131.

Code	Log in iBMC	Error Message	Corrective Action
0017	Yes	WARN SETUP INVALID Error	See "Getting Help" on page 131.
0018	Yes	WARN DIMM COMPAT MINOR X16 C0MBO Error	See "Getting Help" on page 131.
0019	Yes	WARN DIMM COMPAT MINOR MAX RANKS Error	See "Getting Help" on page 131.
001A	Yes	WARN DIMM COMPAT MINOR QR Error	See "Getting Help" on page 131.
001B	Yes	WARN DIMM COMPAT MINOR NOT SUPPORTED Error	See "Getting Help" on page 131.
001C	Yes	WARN LOCKSTEP DISABLE MINOR RAS MODE Error	See "Getting Help" on page 131.
001D	Yes	WARN LOCKSTEP DISABLE MINOR MISMATCHED Error	See "Getting Help" on page 131.
001E	Yes	WARN USER DIMM DISABLE QUAD AND 3DPC Error	See "Getting Help" on page 131.
001F	Yes	WARN USER DIMM DISABLE MEMTEST Error	See "Getting Help" on page 131.

Code	Log in iBMC	Error Message	Corrective Action
0020	Yes	WARN MEMTEST DIMM DISABLE Error	See "Getting Help" on page 131.
0021	Yes	WARN MIRROR DISABLE MINOR RAS DISABLED Error	See "Getting Help" on page 131.
0022	Yes	WARN MIRROR DISABLE MINOR MISMATCH Error	See "Getting Help" on page 131.
0023	Yes	WARN MIRROR DISABLE MINOR MEMTEST Error	See "Getting Help" on page 131.
0024	Yes	WARN MEM LIMIT Error	See "Getting Help" on page 131.
0025	Yes	WARN SPARE DISABLE Error	See "Getting Help" on page 131.
0026	Yes	WARN UNUSED MEMORY MINOR MIRROR Error	See "Getting Help" on page 131.
0027	Yes	WARN UNUSED MEMORY MINOR LOCKSTEP Error	See "Getting Help" on page 131.
0028	Yes	WARN RD DQ DQS Error	See "Getting Help" on page 131.
0029	Yes	WARN RD RCVEN Error	See "Getting Help" on page 131.
002A	Yes	WARN WR LEVEL Error	See "Getting Help" on page 131.

Code	Log in iBMC	Error Message	Corrective Action
002B	Yes	WARN WR DQ DQS Error	See "Getting Help" on page 131.
002C	Yes	WARN DIMM POP RUL MINOR OUT OF ORDER Error	See "Getting Help" on page 131.
002D	Yes	WARN DIMM POP RUL MINOR INDEPENDENT MODE Error	See "Getting Help" on page 131.
002E	Yes	WARN CLTT MINOR NO TEMP SENSOR Error	See "Getting Help" on page 131.
002F	Yes	WARN CLTT MINOR CIRCUIT TST FAILED Error	See "Getting Help" on page 131.
0030	Yes	WARN THROT INSUFFICIENT Error	See "Getting Help" on page 131.
0031	Yes	WARN CLTT DIMM UNKNOWN Error	See "Getting Help" on page 131.
0032	Yes	WARN DQS TEST MINOR CLEANUP Error	See "Getting Help" on page 131.
0033	Yes	WWARN DQS TEST MINOR DELAYS Error	See "Getting Help" on page 131.
0034	Yes	WARN MEM TEST Error	See "Getting Help" on page 131.

Code	Log in iBMC	Error Message	Corrective Action
0035	Yes	WARN DIMM VREF NOT PRESENT Error	See "Getting Help" on page 131.
0036	Yes	WARN DDR3L MIXED Error	See "Getting Help" on page 131.
0037	Yes	WARN DDR3L 3DPC Error	See "Getting Help" on page 131.
0038	Yes	WARN DDR3L 2DPC 1333 Error	See "Getting Help" on page 131.
0039	Yes	WARN DDR3L FORCE 150 Error	See "Getting Help" on page 131.
003A	Yes	WARN MEM OVERRIDE DISABLED Error	See "Getting Help" on page 131.
0040	Yes	Refresh timer test failed	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
0041	Yes	Display memory test failed	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
0042	Yes	CMOS Display Type Wrong	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
0044	Yes	DMA Controller Error	See "Troubleshooting System Memory" on page 115. If the problem persists, see "Getting Help" on page 131.

Code	Log in iBMC	Error Message	Corrective Action
0045	Yes	DMA-1 Error	See "Troubleshooting System Memory" on page 115. If the problem persists, see "Getting Help" on page 131.
0046	Yes	DMA-2 Error	See "Troubleshooting System Memory" on page 115. If the problem persists, see "Getting Help" on page 131.
0047	Yes	Unknown BIOS error	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
0048	Yes	Password check failed	Reset password. See "Jumper Settings" on page 123. If the problem persists, see "Getting Help" on page 131.
0049	Yes	Unknown BIOS error	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
004A	Yes	Unknown BIOS error	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
004B	Yes	Unknown BIOS error	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
005E	Yes	Password check failed	Reset password. See "Jumper Settings" on page 123. If the problem persists, see "Getting Help" on page 131.

Code	Log in iBMC	Error Message	Corrective Action
005D	Yes	S.M.A.R.T. Command Failed S.M.A.R.T. Status BAD, Backup and Replace	See "Getting Help" on page 131.
0060	Yes	Primary Master Hard Disk Error	See "Troubleshooting a Hard Drive" on page 117.
0061	Yes	Primary Slave Hard Disk Error	See "Troubleshooting a Hard Drive" on page 117.
0062	Yes	Secondary Master Hard Disk Error	See "Troubleshooting a Hard Drive" on page 117.
0063	Yes	Secondary Slave Hard Disk Error	See "Troubleshooting a Hard Drive" on page 117.
0080	Yes	Primary Master Drive - ATAPI Incompatible	See "Troubleshooting a Hard Drive" on page 117.
0081	Yes	Primary Slave Drive - ATAPI Incompatible	See "Troubleshooting a Hard Drive" on page 117.
0082	Yes	Secondary Master Drive - ATAPI Incompatible	See "Troubleshooting a Hard Drive" on page 117.

Code	Log in iBMC	Error Message	Corrective Action
0083	Yes	Secondary Slave Drive - ATAPI Incompatible	See "Troubleshooting a Hard Drive" on page 117.
0101	Yes	Warning! This system board does not support the power requirements of the installed processor. The processor will be run at a reduced frequency, which will impact system performance.	Ensure that your processors match and conform to the type described in the processor technical specifications outlined in your system's Getting Started Guide. See "Troubleshooting Processors" on page 120.
0102	Yes	Error! The CPU Core to Bus ratio or VID configuration has failed! Please enter BIOS Setup and re-config it.	The message is displayed on the screen, an error is logged to the SEL, and user input is required to continue. The user can take immediate corrective action or choose to continue booting.
0120	Yes	Thermal Failure detected by PROCHOT#	Ensure that the processor heat sinks are properly installed. See "Troubleshooting Processors" on page 120 and "Troubleshooting System Cooling Problems" on page 114.

Code	Log in iBMC	Error Message	Corrective Action
0121	Yes	Thermal Failure detected by PROCHOT#	Ensure that the processor heat sinks are properly installed. See "Troubleshooting Processors" on page 120 and "Troubleshooting System Cooling Problems" on page 114.
0122	Yes	Thermal Failure detected by PROCHOT#	Ensure that the processor heat sinks are properly installed. See "Troubleshooting Processors" on page 120 and "Troubleshooting System Cooling Problems" on page 114.
0123	Yes	Thermal Failure detected by PROCHOT#.	Ensure that the processor heat sinks are properly installed. See "Troubleshooting Processors" on page 120 and "Troubleshooting System Cooling Problems" on page 114.
0124	Yes	Thermal Failure detected by PROCHOT#	Ensure that the processor heat sinks are properly installed. See "Troubleshooting Processors" on page 120 and "Troubleshooting System Cooling Problems" on page 114.
0125	Yes	Thermal Failure detected by PROCHOT#	Ensure that the processor heat sinks are properly installed. See "Troubleshooting Processors" on page 120 and "Troubleshooting System Cooling Problems" on page 114.
0126	Yes	Thermal Failure detected by PROCHOT#	Ensure that the processor heat sinks are properly installed. See "Troubleshooting Processors" on page 120 and "Troubleshooting System Cooling Problems" on page 114.
0127	Yes	Thermal Failure detected by PROCHOT#	Ensure that the processor heat sinks are properly installed. See "Troubleshooting Processors" on page 120 and "Troubleshooting System Cooling Problems" on page 114.

Code	Log in iBMC	Error Message	Corrective Action
0150	Yes	Processor failed BIST	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
0151	Yes	Processor failed BIST	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
0152	Yes	Processor failed BIST	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
0153	Yes	Processor failed BIST	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
0154	Yes	Processor failed BIST	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
0155	Yes	Processor failed BIST	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
0156	Yes	Processor failed BIST	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
0157	Yes	Processor failed BIST	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.

Code	Log in iBMC	Error Message	Corrective Action
0160	Yes	Processor missing microcode	A BIOS update is required. If the problem persists, see "Getting Help" on page 131.
0161	Yes	Processor missing microcode	A BIOS update is required. If the problem persists, see "Getting Help" on page 131.
0162	Yes	Processor missing microcode	A BIOS update is required. If the problem persists, see "Getting Help" on page 131.
0163	Yes	Processor missing microcode	A BIOS update is required. If the problem persists, see "Getting Help" on page 131.
0164	Yes	Processor missing microcode	A BIOS update is required. If the problem persists, see "Getting Help" on page 131.
0165	Yes	Processor missing microcode	A BIOS update is required. If the problem persists, see "Getting Help" on page 131.
0166	Yes	Processor missing microcode	A BIOS update is required. If the problem persists, see "Getting Help" on page 131.
0167	Yes	Processor missing microcode	A BIOS update is required. If the problem persists, see "Getting Help" on page 131.
0180	Yes	BIOS does not support current stepping	Ensure that your processors match and conform to the type described in the processor technical specifications outlined in your system's *Getting Started Guide*.

Code	Log in iBMC	Error Message	Corrective Action
0181	Yes	BIOS does not support current stepping	Ensure that your processors match and conform to the type described in the processor technical specifications outlined in your system's *Getting Started Guide*.
0182	Yes	BIOS does not support current stepping	Ensure that your processors match and conform to the type described in the processor technical specifications outlined in your system's *Getting Started Guide*.
0183	Yes	BIOS does not support current stepping	Ensure that your processors match and conform to the type described in the processor technical specifications outlined in your system's *Getting Started Guide*.
0184	Yes	BIOS does not support current stepping	Ensure that your processors match and conform to the type described in the processor technical specifications outlined in your system's *Getting Started Guide*.
0185	Yes	BIOS does not support current stepping	Ensure that your processors match and conform to the type described in the processor technical specifications outlined in your system's *Getting Started Guide*.
0186	Yes	BIOS does not support current stepping	Ensure that your processors match and conform to the type described in the processor technical specifications outlined in your system's *Getting Started Guide*.
0187	Yes	BIOS does not support current stepping	Ensure that your processors match and conform to the type described in the processor technical specifications outlined in your system's *Getting Started Guide*.

Code	Log in iBMC	Error Message	Corrective Action
0194	Yes	CPUID, Processor family are different	Ensure that your processors match and conform to the type described in the processor technical specifications outlined in your system's *Getting Started Guide*.
0196	Yes	CPUID, Processor Model are different	Ensure that your processors match and conform to the type described in the processor technical specifications outlined in your system's *Getting Started Guide*.
0193	Yes	CPUID, Processor stepping are different	Ensure that your processors match and conform to the type described in the processor technical specifications outlined in your system's *Getting Started Guide*.
0192	Yes	L2 cache size mismatch	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.
0197	Yes	Processor speeds mismatched	Ensure that your processors match and conform to the type described in the processor technical specifications outlined in your system's *Getting Started Guide*.
0198	Yes	Processor Mismatch	Ensure that your processors match and conform to the type described in the processor technical specifications outlined in your system's *Getting Started Guide*.
0400	Yes	AHCI Port0 HDD Error	See "Troubleshooting a Hard Drive" on page 117.
0401	Yes	AHCI Port1 HDD Error	See "Troubleshooting a Hard Drive" on page 117.
0402	Yes	AHCI Port2 HDD Error	See "Troubleshooting a Hard Drive" on page 117.

Code	Log in iBMC	Error Message	Corrective Action
0403	Yes	AHCI Port3 HDD Error	See "Troubleshooting a Hard Drive" on page 117.
0404	Yes	AHCI Port4 HDD Error	See "Troubleshooting a Hard Drive" on page 117.
0405	Yes	AHCI Port5 HDD Error	See "Troubleshooting a Hard Drive" on page 117.
5120	Yes	CMOS cleared by jumper	Reset password. See "Jumper Settings" on page 123. If the problem persists, see "Getting Help" on page 131.
5121	Yes	Password cleared by jumper	Reset password. See "Jumper Settings" on page 123. If the problem persists, see "Getting Help" on page 131.
5125	Yes	Not enough space to copy PCI Option ROM	See "Getting Help" on page 131.
8101	Yes	Warning! USB Host Controller not found at the specified address!!!	See "Troubleshooting a USB Device" on page 108. If the problem persists, see "Getting Help" on page 131.
8102	Yes	Error! USB device failed to initialize!!!	See "Troubleshooting a USB Device" on page 108. If the problem persists, see "Getting Help" on page 131.
8103	Yes	Warning! Unsupported UBS device found and disabled!!!	See "Troubleshooting a USB Device" on page 108. If the problem persists, see "Getting Help" on page 131.

Code	Log in iBMC	Error Message	Corrective Action
8104	Yes	Warning! Port 60h/64h emulation is not supported by this USB Host Controller!!!	See "Troubleshooting a USB Device" on page 108. If the problem persists, see "Getting Help" on page 131.
8105	Yes	Warning! EHCI controller disabled. It requires 64-bit data support in the BIOS.	See "Troubleshooting a USB Device" on page 108. If the problem persists, see "Getting Help" on page 131.
8301	Yes	Not enough space in Runtime area! SMBIOS data will not be available.	See "Troubleshooting System Memory" on page 115. If the problem persists, see "Getting Help" on page 131.
8302	Yes	Not enough space in Runtime area! SMBIOS data will not be available.	See "Troubleshooting System Memory" on page 115. If the problem persists, see "Getting Help" on page 131.
8601	Yes	Error: iBMC Not Responding	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.

Code	Log in iBMC	Error Message	Corrective Action
8701	Yes	Insufficient Runtime space for MPS data. System may operate in PCI or Non-MPS mode.	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 131.

Beep Codes

The following table describes the system pre post beep codes.

Table 1-10. Pre Post Beep Codes

Number of Beeps	Description
1	No media
2	Boot-block BIOS file absent
3	Insert next diskette in A:
4	Flash program successful
5	Read file error
7	No flash present
8	Floppy controller error
10	Flash erase error
11	Flash program error
12	Wrong BIOS file size
13	ROM image mismatch
14 (1 long beep after 4 beeps)	BIOS recovery by jumper

Post Beep Codes

Table 1-11. Post Beep Codes

Number of Beeps	Description
1	Refresh timer error
3	Base 64 K memory failure
6	8042 – gate A20 failure
8	Display memory read/write failure
2	Exception interrupt shutdown
3	No main memory

Other Information You May Need

WARNING: See the safety and regulatory information that shipped with your system. Warranty information may be included within this document or as a separate document.

- The *Getting Started Guide* provides an overview of rack installation, system features, setting up your system, and technical specifications.
- Dell systems management application documentation provides information about installing and using the systems management software. This document is available online at **support.dell.com/manuals**.

NOTE: Always check for updates on **support.dell.com/manuals** and read the updates first because they often supersede information in other documents.

2

Using the System Setup Program

Start Menu

The system employs the latest AMI Core BIOS, which is stored in Flash memory. The Flash memory supports the Plug and Play specification, and contains a System Setup program, the Power-On Self-Test (POST) routine, and the PCI auto-configuration utility.

This system board supports system BIOS shadowing, enabling the BIOS to execute from 64-bit onboard write-protected DRAM.

The system board helps to configure the following items:

- Hard drives, diskette drives, and peripherals
- Password protection from unauthorized use
- Power management features

This Setup utility should be executed under the following conditions:

- When changing the system configuration
- When a configuration error is detected by the system and you are prompted to make changes to the Setup utility
- When redefining the communication ports to prevent any conflicts
- When changing the password or making other changes to the security setup

NOTE: Only items in brackets [ ] can be modified. Items that are not in brackets are display only.

System Setup Options at Boot

You can initiate Setup by pressing <F2> during POST.

Console Redirection

The console redirection allows a remote user to diagnose and fix problems on a system, which has not successfully booted the operating system. The centerpiece of the console redirection is the BIOS Console. The BIOS Console is a Flash ROM-resident utility that redirects input and output over a serial or modem connection.

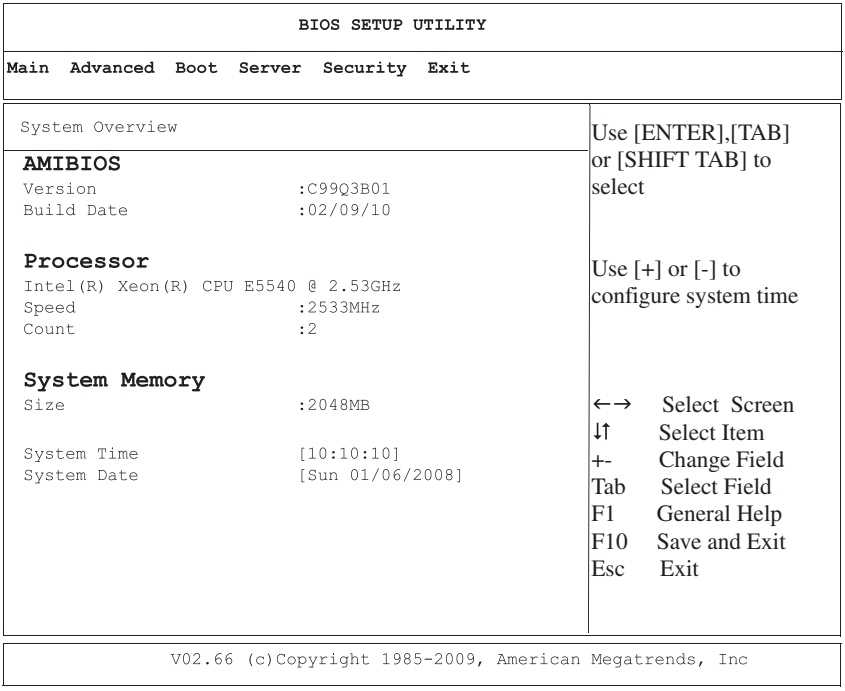
The BIOS supports console redirection to a serial port. If a serial port based headless system support is provided by the system, the system must provide support for redirection of all BIOS driven console I/O to the serial port. The driver for the serial console must be capable of supporting the functionality documented in the ANSI Terminal Definition.

Main Menu

The main menu displays information about your system board and BIOS.

Main Screen

Figure 2-1. System Setup Program Main Screen



NOTE: The options for the System Setup program change based on the system configuration.

NOTE: The System Setup program defaults are listed under their respective options in the following sections, where applicable.

AMIBIOS Settings

Option	Description
Version	Displays the BIOS version. Check this version number when updating BIOS from the manufacturer.
Build Date	Displays the date the BIOS was created.

Processor Settings

Option	Description
Type	Displays the type of processor installed on the system board.
Speed	Displays the maximum speed of the processor.
Count	Displays the number of installed processors.

System Memory Settings

Option	Description
Size	Displays how much memory (DRAM) is installed on the system board.
System Time	Scroll to adjust the time.
System Date	Scroll to adjust the date.

Advanced Menu

This option displays a table of items that define advanced information about your system.

WARNING: Making incorrect settings to items on these pages may cause the system to malfunction. Unless you have the experience in adjusting these items, it is recommended that you leave these settings at the default values. If making settings to items on these pages causes your system to malfunction or prevents the system from booting, open BIOS and choose "Load Optimal Defaults" in the Exit menu to boot up normally.

Processor Configuration

Option	Description
Hardware Prefetcher (**Enabled** default)	Enable this option to control the **Hardware Prefetcher** feature.
Adjacent Cache Line Prefetch (**Enabled** default)	Enable this option to control the **Adjacent Cache Line Prefetch** feature.
Max CPUID Value Limit (**Disabled** default)	Enable this option to limit the maximum CPUID input value to 03h when queried, even if the processor supports a higher CPUID input value. **NOTE:** This feature is disabled for Windows® XP Intel® processors from Pentium™ Pro onwards, except Intel Pentium 4, that have a maximum CPUID input value of only 02h or 03h.
Intel(R) Virtualization Tech (**Enabled** default)	Enable this option when the processor supports VT. A full reset is needed to change its state.
Execute-Disable Bit Capability (**Enabled** default)	When **Disabled**, forces the XD feature flag to always return 0.
Active Processor Cores (**All** default)	Sets the number of cores to enable in each processor package.
Intel(R) HT Technology (**Enabled** default)	When **Disabled**, allows only one thread per enabled core.
Intel(R) SpeedStep(TM) tech (**Enabled for OS** default)	Allows the clock speed of the processor to be dynamically changed by software.
Intel(R) TurboMode tech (**Enabled** default)	Allows processor cores to run faster than marked frequency in specific condition.
Intel(R) C-STATE tech (**Enabled** default)	CState: CPU idle is set to C1/C2/C3/C6.
C3 State (**Disabled** default)	Selects C3 state.
C6 State (**Enabled** default)	Selects C6 state.

Option	Description
NUMA Support (**Disabled** default)	When **Enabled**, executes software for NUMA aware OS. When **Disabled**, allows better memory access performance for non-NUMA OS.

Memory Configuration

Option	Description
Current Memory Frequency	Displays the current memory frequency.
Memory Turbo Mode (**Disabled** default)	Enables/disables the memory turbo mode.
Memory Frequency (**Auto** default)	Forces a DDR3 frequency slower than the common tck detected using SPD.
Memory Mode (**Independent** default)	Selects the memory mode.
Throttling - Closed Loop (**Enabled** default)	Enables BIOS to program Closed Loop throttling for memory components.
Throttling - Open Loop (**Enabled** default)	Enables BIOS to program Open Loop throttling for memory components.

IDE Configuration

Option	Description
SATA Configuration (**Enhanced** default)	Configures the SATA.
Configure SATA#1 as (**IDE** default)	Configures the SATA#1. • IDE • AHCI • RAID
Hard Disk Write Protect (**Disabled** default)	Enables or disables device write protection. This is effective only if the device is accessed through BIOS.
IDE Detect Time Out (Sec)	Selects the time out value for detecting ATA/ATAPI device(s).

Super IO Configuration

Option	Description
Serial Port1 Address (**3F8/IRQ4** default)	Assigns the I/O address and IRQ for the first onboard serial port.
Serial Port2 Address (**3F8/IRQ4** default)	Assigns the I/O address and IRQ for the second onboard serial port.

USB Configuration

Option	Description
USB Devices Enabled	Displays USB devices currently detected.
Legacy USB Support (**Auto** default)	Enables support for legacy USB devices. Select **Auto** to disable legacy support if no USB devices are connected.
USB 2.0 Controller	Configures the USB 2.0 controller in HiSpeed (480 Mbps) or FullSpeed (12 Mbps).
USB Mass Storage Reset Delay (**20 Sec** default)	Sets the number of seconds that the POST waits for the USB mass storage device after the start unit command is issued.
Device#	USB device model name.
Emulation Type (**Auto** default)	If the type is set to **Auto**, USB devices which are less than 530 MB are emulated as floppies and the others are emulated as hard drives. Forced FDD option can be used to force a formatted hard drive to boot as FDD (e.g. ZIP drive).

PCI Configuration

Option	Description
NIC1 KAWELA (**Enable with PXE** default)	Enables or disables onboard 82576 NIC1 PXE option ROM.
NIC2 KAWELA (**Enable with PXE** default)	Enables or disables onboard 82576 NIC2 PXE option ROM.

Option	Description
PCI-E SLOT Option Rom (**Enabled** default)	Enables or disables add-on card option ROM.
PCI-E Connector Option Rom (**Enabled** default)	Enables or disables board to board PCI-E connector option ROM.
NIC1 Mac Address	Displays the NIC1 MAC address.
NIC2 Mac Address	Displays the NIC2 MAC address.
Current QPI Frequency	Displays the QPI frequency.
QPI Link Speed (**Full-Speed** default)	Sets the QPI link speed.
QPI Frequency (**Auto** default)	Sets the QPI frequency to AUTO/4.800GT/5.866GT/6.400GT.
QPI L0s and L1 (**Enabled** default)	Enables or disables the QPI L0s and L1.
Crystal Beach / DMA (**Disabled** default)	Enables or disables the Crystal Beach/DMA configuration.
Intel VT-d (**Disabled** default)	Enables or disables the Intel® Virtualization Technology for Directed I/O.
SR-IOV Supported (**Disabled** default)	Enables or disables SR-IOV support.
Active State Power Management (**Disabled** default)	Enables the individual serial Links in a PCI Express fabric to be incrementally reduced as a Link becomes less active.
ME Support (**Enabled** default)	Enables the Management Engine (ME) to allow for the use of Intel AMT.
iSCSI Remote Boot	Enable or disable onboard LAN to iSCSI.

Boot Menu

Option	Description
Boot Settings Configuration	Configures the settings during system boots.
Boot Device Priority	Specifies the boot device priority.
Hard Disk Drives	Specifies the boot device priority sequence from the available hard drives.
CD/DVD Drives	Specifies the boot device priority sequence from the available CD/DVD drives.
Network Device	Specifies the network device.
USB Drives	Specifies the boot device priority sequence from the available USB drives.

Boot Settings Configuration

Option	Description
Quick Boot (**Enabled** default)	Enables you to allow BIOS to skip certain tests during the POST, which decreases boot up time.
Quiet Boot (**Enabled** default)	Enable or disable quiet boot. **Disabled**: displays normal POST messages. **Enabled**: displays OEM logo instead of POST messages.
AddOn ROM Display Mode (**Force BIOS** default)	Enables you to display mode controlled by BIOS or addon ROM.
Bootup Num-Lock (**On** default)	Enables you to set the state of the keyboard keypad on boot. **On**: The keypad functions as a keypad. **Off**: The keypad functions as auxiliary cursor movement keys.
Wait For 'F1' If Error (**Disabled** default)	Enables the system to prompt you to press <F1> if an error occurs. This enables you to view the error.
Hit 'F2' Message Display (**Enabled** default)	Enables the system to prompt you to press <F2> to enter the BIOS Setup Utility.

Option	Description
Force PXE First (**Enabled** default)	Enables forced network boot (PXE).
Force PXE Boot Only	Enable or disable PXE to be the only boot device.
Force USB First	Enable force USB to be the first boot device.

Server Menu

NOTE: Delay Time, Minimum time, and Maximum time are only shown in SETUP screen when AC Power Recovery Delay is set to User define. The selection of Restore on AC Power Loss setup to Power-on or Last State takes 60 seconds for running iBMC initialization after AC Power on.

Option	Description
Status of iBMC	Displays the status of iBMC.
IPMI Specification Version	Displays the iBMC supported IPMI version.
iBMC Firmware Version	Displays the firmware version of iBMC.
Set iBMC LAN Configuration	Input for Set LAN configuration command.
Remote Access Configuration	Configures remote access.
Restore on AC Power Loss (**Power Off** default)	Restores the AC power setting. The options are **Power Off**, **Power On** and **Last State**.
Power Staggering AC Recovery (**Immediate** default)	Selects the time of system power on after iBMC initiates. **Immediate**: powers on directly after iBMC initiates. **Random**: randomly selects time to power on. **User define**: allows the user to select the time.
Power On Delay	Sets the AC power recovery delay time.
View iBMC System Event Log	Displays all events in the iBMC Event Log.
Clear iBMC System Event Log	Clears all events in iBMC System Event Log.
Event Logging (**Enabled** default)	Enables or disables BIOS to record Event Logging.
ECC Event Logging (**Enabled** default)	Enables or disables ECC Event Logging.
PCI Error Logging (**Enabled** default)	Enables or disables PCI Error Logging.

Option	Description
QPI Error Logging (**Enabled** default)	Enables or disables IOH QPI 0/1 error.
IOH Internal Error Logging (**Enabled** default)	Enables or disables IOH Internal error logging.
NMI on Error (**Fatal** default)	Enable to set the state of NMI on Error: • **Fatal**: Fatal error issue NMI. • **Uncorrectable**: Fatal and Uncorrectable errors issue NMI. • **Correctable**: Issues NMI on all errors.

iBMC LAN Configuration

Option	Description
Channel Number	Displays channel number of iBMC.
Channel Number Status (**01** default)	Displays channel number status of iBMC.
iBMC LAN Port Configuration (**Shared-NIC** default)	Select the iBMC LAN Port Configuration type.
DHCP Enabled (**Disabled** default)	Enables or disables the iBMC to get the LAN IP from a DHCP server.
IP Address	Enter an IP address in decimal in the form of XXX.XXX.XXX.XXX (XXX less than 256 and in decimal only).
Subnet Mask	Enter a Subnet Mask in decimal in the form of XXX.XXX.XXX.XXX (XXX less than 256 and in decimal only).
Gateway Address	Enter Gateway Address in decimal in the form of XXX.XXX.XXX.XXX (XXX less than 256 and in decimal only).
Current MAC Address in iBMC	Displays the MAC address of iBMC.
IPV6 Mode	Enable or disable IPv6 support in iBMC.

Option	Description
IPv6 AutoConfig	Enable or disable IPv6 auto config.
IPv6 Prefix Length	Enter the IPv6 prefix length in decimal in the form of xxx (xxx less than 128 and in decimal only).
IPv6 IP Address	Enter IPv6 address in string form.
IPv6 Gateway Address	Enter IPv6 Gateway address in string from.

Remote Access Configuration

Option	Description
Remote Access (**Enabled** default)	Selects remote access type.
Serial Port Number (**COM1** default)	Selects serial port for console redirection.
Current SOL Baud Rate	Displays the current SOL Baud Rate.
Serial Port Mode (**115200 8,n,1** default)	Selects serial port settings. The default value may change if SOL baud rate is fixed by customer request.
Flow Control (**None** default)	Selects flow control for console redirection.
Redirection After BIOS POST (**Enabled** default)	Selects the settings for the redirection. • **Disabled**: turns off the redirection after POST. • **Enabled**: redirection is always active.
Terminal Type (**ANSI** default)	Selects the target terminal type.

NOTE: When **Flow Control** is set to **Software**, the Hyper Terminal on remote side is discontinued by pressing <Ctrl><S>. But the <Ctrl><S> is also the **Setup Key Stroke** for setting onboard NIC PXE Option ROM Configuration. Therefore, we suggest users change <Ctrl><S> to <Ctrl><B> in PXE OPROM Configuration in order to avoid that the Hyper Terminal on remote side is discontinued when pressing <Ctrl><S>.

Security Menu

Option	Description
Supervisor Password	Displays whether the supervisor password is installed or not.
User Password	Displays whether the user password is installed or not.
Change Supervisor Password/ Change User Password	Use this option to install, change or clear the password. If you select these items and press **Enter**, a dialog box appears and then you can enter a password. You can enter no more than six letters or numbers. Press **Enter** after you have typed in the password. A second dialog box asks you to retype the password for confirmation. Press **Enter** after you have retyped it correctly. The password is required at boot time, or when the user enters the Setup Utility.
User Access Level	Set user access level to the setup utility.
Clear User Password	Select to clear the user password.
Password Check	Set the password check mode.

Exit Menu

Option	Description
Save Changes and Exit	Select to save any changes that you have made in the Setup utility and exit the Setup utility.
Discard Changes and Exit	Select to discard any changes that you have made in the Setup utility and exit the Setup utility.
Discard Changes	Select to discard any changes you have made without leaving the Setup utility.
Load Optimal Defaults	Select to install optimal settings for all the items in the Setup utility.
Load 2nd Defaults	Select to install 2nd default values from GPNV for all the items in the Setup utility.
Save 2nd Defaults	Select to save all the setup questions to GPNV as 2nd default values.

3

Installing System Components

Safety Instructions

WARNING: Working on systems that are still connected to a power supply can be extremely dangerous.

CAUTION: System components and electronic circuit boards can be damaged by discharge of static electricity.

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

To avoid injury to yourself or damage to your system, follow these guidelines:

- Always disconnect the system from the power outlet whenever you are working inside the system case.
- If possible, wear a grounded wrist strap when you are working inside the system case. Alternatively, discharge any static electricity by touching the bare metal chassis of the system case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Do not flex or stress the circuit board.
- Leave all components inside the static-proof packaging until they are ready for installation.

Recommended Tools

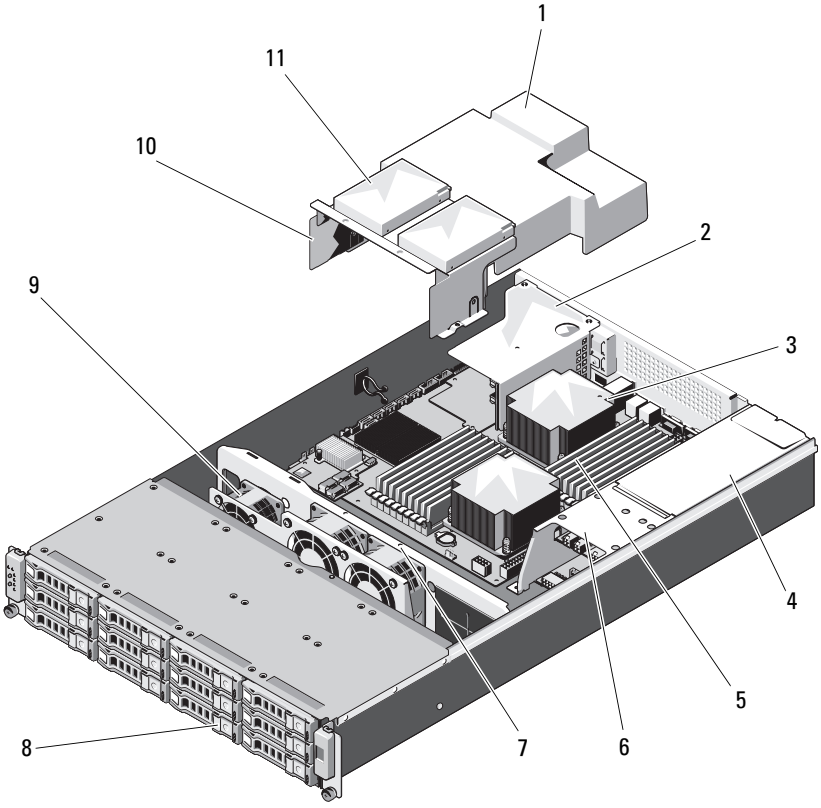
- Phillips screwdriver
- Flat-tipped screwdriver

Inside the System

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

CAUTION: This system must be operated with the system cover installed to ensure proper cooling.

Figure 3-1. Inside the System



1	cooling shroud	2	expansion-card riser assembly
3	heat sink/processors (1 or 2)	4	power supply bay
5	memory modules (18)	6	power distribution board assembly
7	cooling fan assembly	8	hard drives (12)
9	cooling fans (3)	10	hard-drive assembly
11	internal hard drives (2)		

Hard Drives

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

CAUTION: Use only hard drives that have been tested and approved for use with the SAS/SATA backplane.

CAUTION: When you remove or install the hard drive, take note of the drive carrier orientation before sliding it out. The carrier does not fit back into the bay if inserted incorrectly. Make sure that the hard drive is connected to the hard drive connector on the backplane

CAUTION: When installing a hard-drive carrier, ensure that the adjacent drives are fully installed. Inserting a hard-drive carrier and attempting to lock its handle next to a partially installed carrier can damage the partially installed carrier's shield spring and make it unusable.

CAUTION: To prevent data loss, ensure that your operating system supports hot-swap drive installation. See the documentation supplied with the operating system.

CAUTION: Combining SATA and SAS hard drives in the same system configuration is not supported.

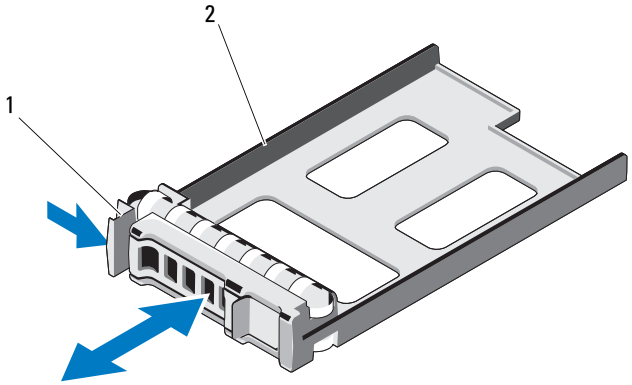
Your system supports up to twelve 3.5" hard drives and two optional internal 2.5" hard drives.

Removing a Hard-Drive Blank

CAUTION: To maintain proper system cooling, all empty hard-drive bays must have drive blanks installed.

Press the release button and slide the hard-drive blank out of the hard-drive bay. See Figure 3-2.

Figure 3-2. Removing and Installing a Hard-Drive Blank



1 release lever 2 hard-drive blank

Installing a Hard-Drive Blank

Align the hard-drive blank with the drive bay and insert the blank into the hard-drive bay until the release lever clicks into place. See Figure 3-2.

Removing a Hard-Drive Carrier

1 From the RAID management software, prepare the drive for removal.Wait until the hard-drive indicators on the drive carrier signal that the drive can be removed safely. See your controller documentation for information about hot-swap drive removal.

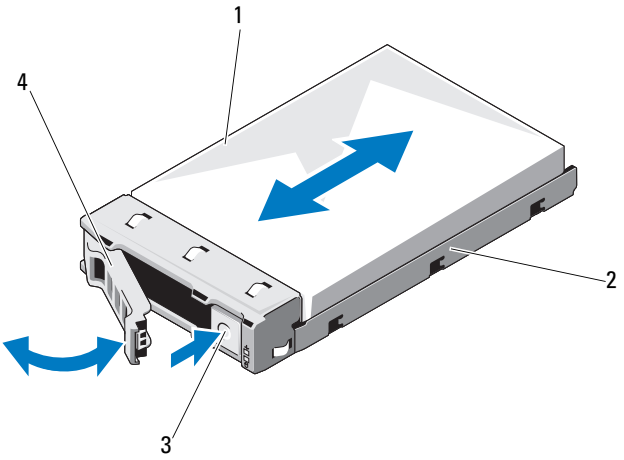
If the drive has been online, the green activity/fault indicator will flash as the drive is powered down. When the drive indicators are off, the drive is ready for removal. See "Hard-Drive Indicator Patterns" on page 12.

2 Press the release button on the front of the hard-drive carrier to open the release lever.

3 Using the release lever, slide the hard-drive carrier out of the hard-drive bay. See Figure 3-3.

4 If you are not installing another hard-drive carrier, insert a hard-drive blank in the vacated drive bay. See "Installing a Hard-Drive Blank" on page 54.

Figure 3-3. Removing and Installing the Hard-Drive Carrier



1	hard drive	2	hard-drive carrier
3	release button	4	hard-drive carrier handle

Installing a Hard-Drive Carrier

1 Press the release button on the front of the hard-drive carrier.

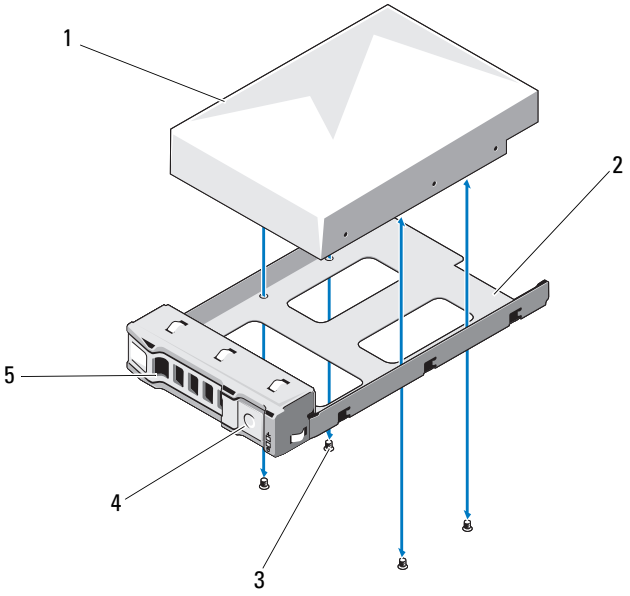
2 With the release lever on the hard-drive carrier open, slide the hard-drive carrier into the hard-drive bay until the carrier contacts the backplane.

3 Close the release lever to lock the hard-drive carrier in place. See Figure 3-3.

Removing a Hard Drive From a Hard-Drive Carrier

1. Turn over the hard drive and remove the four screws on the hard-drive carrier. See Figure 3-4.
2. Lift the hard drive out of the hard-drive carrier.

Figure 3-4. Removing and Installing a Hard Drive From a Hard-Drive Carrier



1	hard drive	2	hard-drive carrier
3	screws (4)	4	release button
5	release lever		

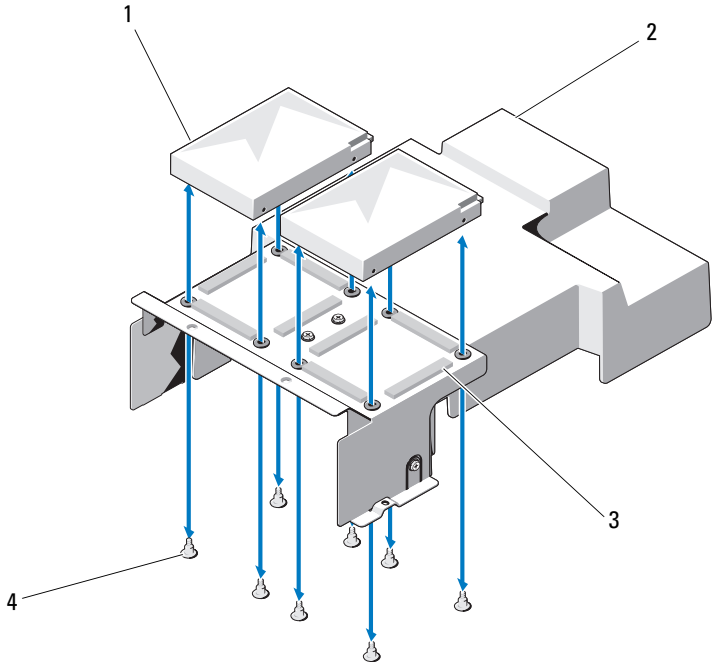
Installing a Hard Drive Into a Hard-Drive Carrier

1. Insert the hard drive into the hard-drive carrier with the connector end of the hard drive at the back. See Figure 3-4.
2. Align the slots on the hard drive with the slots on the hard-drive carrier.
3. Attach the four screws to secure the hard drive to the hard-drive carrier.

Removing the Optional Internal Hard Drive

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Open the system. See "Opening the System" on page 58.
3. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 60.
4. Remove the eight screws that secure the internal hard drives to the hard-drive assembly. See Figure 3-5.
5. Remove the internal hard drives.

Figure 3-5. Removing and Installing the Internal Hard Drive



1	internal hard drives (2)	2	cooling shroud
3	hard-drive assembly	4	screws (8)

Installing the Optional Internal Hard Drive

1. Place the hard drives in position on the hard drive assembly.
2. Affix the eight screws securing the hard drives to the hard-drive assembly. See Figure 3-5.
3. Replace the cooling shroud. See "Installing the Cooling Shroud" on page 61.
4. Close the system. See "Closing the System" on page 59.
5. Reconnect the system and peripherals to their electrical outlets and turn on the system.

Opening and Closing the System

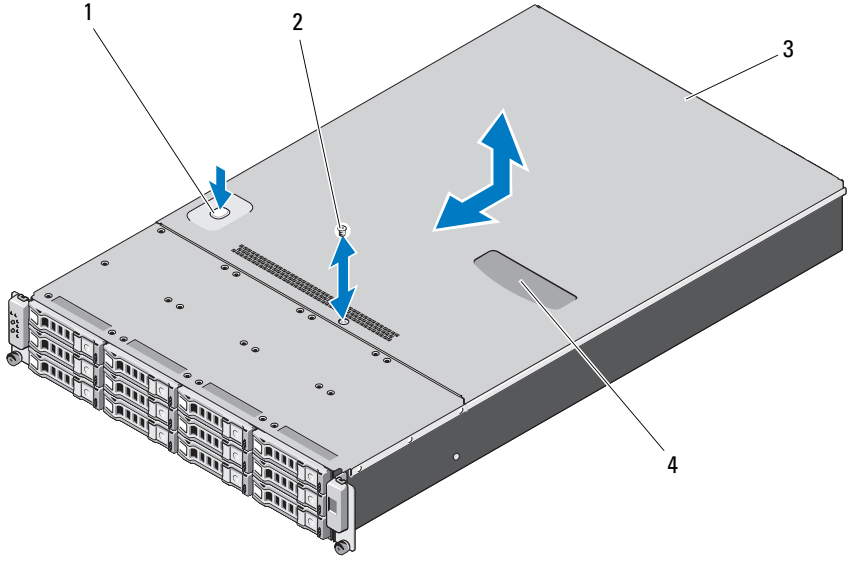
WARNING: Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

Opening the System

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Remove the securing screw on the top of the system. See Figure 3-6.
3. Press down the locking button and with your palms on the traction pad, slide and lift the cover away from the system.

Figure 3-6. Opening and Closing the System



1	locking button	2	screw
3	system cover	4	traction pad

Closing the System

1. Place the cover on the chassis and offset it slightly toward the back of the system, so that the hooks on the sides of the cover fit over the corresponding slots on the sides of the chassis.
2. Slide the cover toward the front of the chassis till the screw hole on the cover is aligned with the hole on the chassis.
3. Secure the cover with the securing screw. See Figure 3-6.
4. Reconnect the system and peripherals to their electrical outlets and turn on the system.

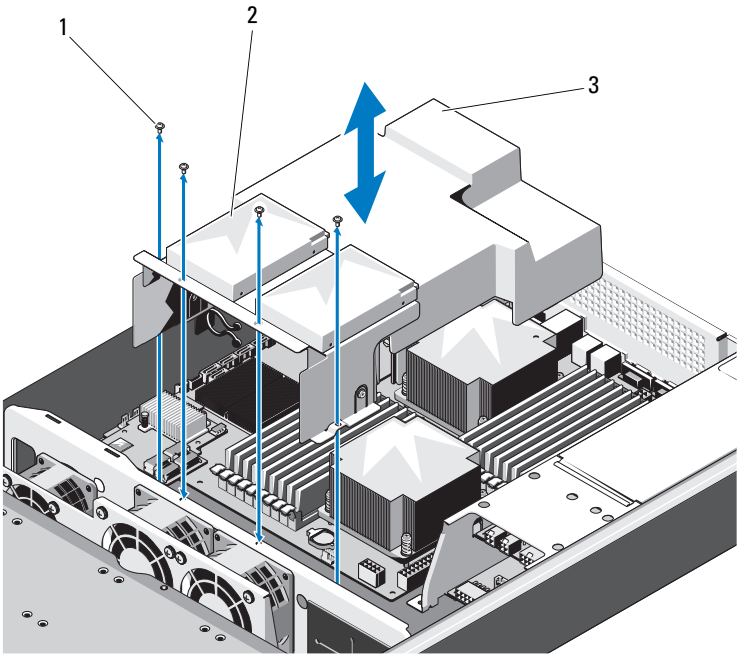
Cooling Shroud

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

Removing the Cooling Shroud

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Open the system. See "Opening the System" on page 58.
3. If applicable, disconnect the internal hard drive cables.
4. Remove the four securing screws. See Figure 3-7.
5. Lift the cooling shroud out and away from the chassis. See Figure 3-7.

Figure 3-7. Removing and Installing the Cooling Shroud



1	screws (4)	2	internal hard drives (2)
3	cooling shroud		

Installing the Cooling Shroud

1. Align the cooling shroud around the sides of the heat sink and along the memory slots and lower it into the system. See Figure 3-7.
2. Secure the cooling shroud using the four screws. See Figure 3-7.
3. If applicable, connect the internal hard drive cables.
4. Close the system. See "Closing the System" on page 59.
5. Reconnect the system and peripherals to their electrical outlets and turn on the system.

Heat Sinks

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

Removing the Heat Sink

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Open the system. See "Opening the System" on page 58.
3. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 60.
4. If required, remove the expansion-card riser assembly. See "Removing the Expansion-Card Riser" on page 74.

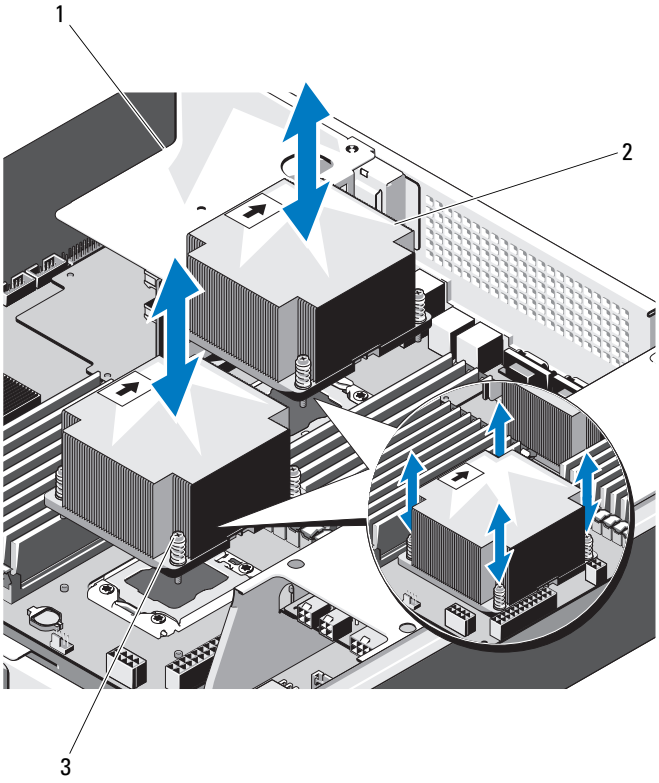
WARNING: The heat sink is hot to touch for some time after the system has been powered down. Allow the heat sink to cool before handling it.

CAUTION: Never remove the heat sink from a processor unless you intend to remove the processor. The heat sink is necessary to maintain proper thermal conditions.

5. Using a #2 Phillips screwdriver, loosen one of the heat-sink captive screws. See Figure 3-8.

   Wait 30 seconds for the heat sink to loosen from the processor.
6. Loosen the screw that is diagonally opposite to the screw that you have already loosened. See Figure 3-8.
7. Repeat step 5 till you have loosened the remaining screws.
8. Gently lift the heat sink off the processor and set the heat sink aside with the thermal grease side facing up.

Figure 3-8. Removing and Installing the Heat Sink



1	expansion-card riser assembly	2	heat sinks (2)
3	captive screws (4 each)		

Installing the Heat Sink

CAUTION: The heat sinks for CPU0 and CPU1 are different and are labeled accordingly. They must be installed in the correct location and orientation to prevent the system from overheating.

1. Using a clean lint-free cloth, remove the thermal grease from the heat sink.
2. Remove the protective cover from the underside of the heat sink.
3. Apply new thermal grease evenly to the center of the top of the new processor.

   NOTE: Using excess thermal grease can cause grease to contact the processor shield, which can cause contamination of the processor socket.
4. Place the heat sink on top of the processor and tighten the four captive screws in the order they were loosened.
5. Replace the cooling shroud. See "Installing the Cooling Shroud" on page 61.
6. If applicable, replace the expansion-card riser assembly. See "Installing the Expansion-Card Riser" on page 76.
7. Close the system. See "Closing the System" on page 59.
8. Reconnect the system and peripherals to their electrical outlets, and turn on the system.

Processor

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

Removing the Processor

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Open the system. See "Opening the System" on page 58.
3. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 60.

4 Remove the heat sink. See "Removing the Heat Sink" on page 62.

CAUTION: The processor is held in its socket under strong pressure. Be aware that the release lever can spring up suddenly if not firmly grasped.

5 Position your thumb firmly over the processor socket-release lever and release the lever from the locked position.

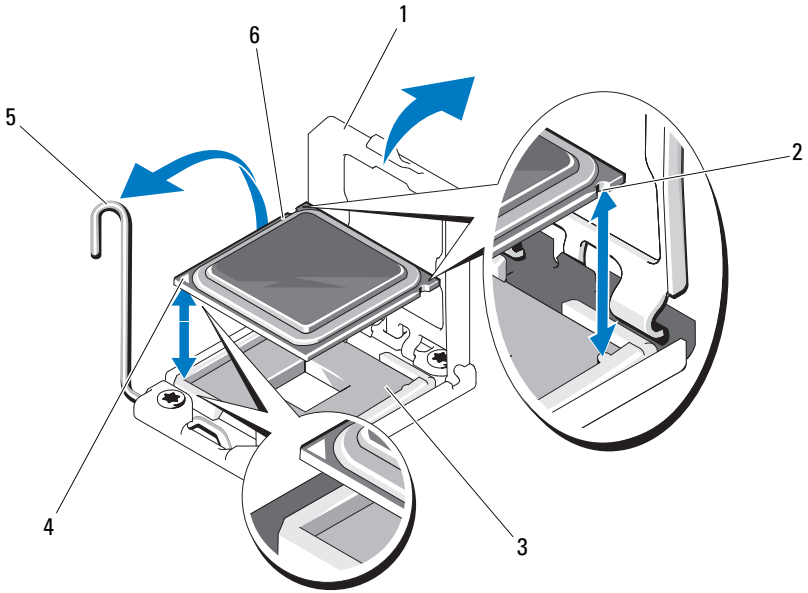
6 Rotate the lever 90 degrees upward until the processor is released from the socket. See Figure 3-9.

7 Rotate the processor shield upward and out of the way.

CAUTION: Be careful not to bend any of the pins on the ZIF socket when removing the processor. Bending the pins can permanently damage the system board.

8 Lift the processor out of the socket and leave the socket-release lever up so that the socket is ready for the new processor.

Figure 3-9. Removing and Installing the Processor



1	processor shield	2	notches in processor (2)
3	ZIF socket	4	pin1 indicator
5	socket-release lever	6	processor

Installing the Processor

NOTE: When installing only one processor, the processor must be installed in CPU0 socket (for the socket location, see Figure 5-3).

NOTE: Your system uses an LGA 1366 socket, which is designed for trouble free insertion of the CPU. After placing the CPU into the socket, press the lever down and lock in place. If you notice any resistance when inserting the CPU, ensure that it is aligned correctly.

NOTE: After removing the processor, place it in an antistatic container for reuse, return, or temporary storage. Do not touch the bottom of the processor. Touch only the side edges of the processor.

NOTE: If you are permanently removing the processor, you must install a processor blank and a heat-sink blank to ensure proper system cooling. Adding the blank is similar to installing a processor.

1. If you are upgrading your processors, prior to upgrading your system, download and install the latest system BIOS version from **support.dell.com**. Follow the instructions included in the file and download to install the update on your system.
2. Pull the locking lever of the processor socket out and up.
3. Unpack the processor if it has not been used previously.

   If the processor has already been used, remove any thermal grease from the top of the processor using a lint-free cloth.
4. Locate the pin 1 indicator on the system board socket.
5. Locate the pin 1 indicator on the top of the processor. See Figure 3-9.

   The pin 1 indicator is shown as a triangle on the top of the processor.
6. Place the processor over the socket with pin 1 aligned with the pin guide on the processor socket.

CAUTION: Positioning the processor incorrectly can permanently damage the system board or the processor. Be careful not to bend the pins in the ZIF socket.

7 Align the notches in the processor with the socket keys on the ZIF socket. See Figure 3-9.

8 With the release lever on the processor socket in the open position, align the processor with the socket keys and set the processor lightly in the socket. See Figure 3-9.

CAUTION: Do not use force to seat the processor. When the processor is positioned correctly, it engages easily into the socket.

9 Close the processor shield.

10 Rotate the socket release lever down until it snaps into place. See Figure 3-9.

11 Using a clean lint-free cloth, remove the thermal grease from the heat sink.

12 Open the grease packet included with your processor kit and apply thermal grease evenly to the center of the top of the new processor.

CAUTION: Using excess thermal grease can cause grease to contact the processor shield, which can cause contamination of the processor socket.

13 Install the heat sink. See "Installing the Heat Sink" on page 64.

14 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 61.

15 Close the system. See "Closing the System" on page 59.

16 Reconnect the system and peripherals to their electrical outlets, and turn on the system.

17 Press <F2> to enter the System Setup program, and check that the processor information matches the new system configuration. See "System Setup Options at Boot" on page 38.

System Memory

Your system supports DDR3 registered DIMMs (RDIMMs). Single-, dual- and quad-rank DIMMs can be 800, 1066 or 1333 MHz.

The system contains 18 memory sockets split into two sets of nine sockets with one set for each processor. Each nine-socket set is organized into three channels of three memory sockets per channel.

The maximum memory that is supported on your system varies according to the types and sizes of memory modules being used:

- Single-rank, and dual-rank RDIMMs of sizes 1 GB, 2 GB, 4 GB, and 8 GB are supported for a total of up to 144 GB.
- Quad-rank RDIMMs (two per channel) are supported for a total of up to 48 GB.

General Memory Module Installation Guidelines

To ensure optimal performance of your system, observe the following general guidelines when configuring your system memory.

NOTE: Memory configurations that fail to observe these guidelines can prevent your system from starting and producing any video output.

- Except for memory channels that are unused, all populated memory channels must have identical configurations.
- The memory configuration for each processor must be identical.
- Memory modules of different sizes can be mixed in A1–A4 or B1–B4 (for example, 2 GB and 4 GB), but all populated channels must have identical configurations.
- For optimizer mode, memory modules are installed in the numeric order of the sockets beginning with A1 or B1.
- For memory mirroring or advanced ECC mode, the channel furthest from the processor is unused and memory modules are installed beginning with channel A1 or B1 and proceeding with channel A2 or B2.
- Advanced ECC mode requires memory modules that use x4 or x8 DRAM device widths.
- The memory speed of each channel depends on the memory configuration:
  - For single- or dual-rank memory modules:
    - One memory module per channel supports up to 1333 MHz.
    - Two memory modules per channel support up to 1066 MHz.
    - Three memory modules per channel support up to 800 MHz, regardless of memory module speed.
  - For quad-rank memory modules:
    - One memory module per channel supports up to 1066 MHz.

    - Two memory modules per channel are limited to 800 MHz, regardless of the memory module speed.
- If quad-rank memory modules are mixed with single- or dual-rank modules, the quad-rank modules must be installed in the sockets with the white release levers.
- If memory modules with different speeds are installed, they operate at the speed of the slowest installed memory module(s).

Mode-Specific Guidelines

Three memory channels are allocated to each processor. The number of channels used and the allowable configurations depend on the memory mode selected.

Optimizer (Independent Channel) Mode

In this mode, all three channels are populated with identical memory modules. This mode permits a larger total memory capacity but does not support SDDC with x8-based memory modules.

A minimal single-channel configuration of one 1 GB memory module per processor is also supported in this mode.

Table 3-1 shows sample memory configurations that follow the appropriate memory guidelines stated in this section. The samples show identical memory-module configurations and their physical and available memory totals. The tables do not show mixed or quad-rank memory-module configurations, nor do they address the memory speed considerations of any configuration.

Supported Memory Configuration

There are eighteen DIMMs on each system board to support processor 0 and processor 1. The DIMM sequence of eighteen DIMM sockets is shown below. When you insert the DIMM(s), you have to always start with DIMM0_CHA. See the following for possible memory configurations.

Table 3-1. Memory Configuration

No. of DIMMs	POR Speed	1N or 2N	DIMM 2	DIMM 1	DIMM 0
1	DDR3-1333	1N	_	_	Single-rank
2	DDR3-1333	1N	_	_	Dual-rank
3	DDR3-1066	1N	_	_	Quad-rank
4	DDR3-1333	1N	_	Single-rank	Single-rank
5	DDR3-1333	1N	_	Single-rank	Dual-rank
6	DDR3-1333	1N	_	Dual-rank	Single-rank
7	DDR3-1333	1N	_	Dual-rank	Dual-rank
8	DDR3-800	1N	_	Single-rank	Quad-rank
9	DDR3-800	1N	_	Dual-rank	Quad-rank
10	DDR3-800	1N	_	Quad-rank	Quad-rank
11	DDR3-800	1N	Single-rank	Single-rank	Single-rank
12	DDR3-800	1N	Single-rank	Single-rank	Dual-rank
13	DDR3-800	1N	Single-rank	Dual-rank	Single-rank
14	DDR3-800	1N	Dual-rank	Single-rank	Single-rank
15	DDR3-800	1N	Single-rank	Dual-rank	Dual-rank
16	DDR3-800	1N	Dual-rank	Single-rank	Dual-rank
17	DDR3-800	1N	Dual-rank	Dual-rank	Single-rank
18	DDR3-800	1N	Dual-rank	Dual-rank	Dual-rank

NOTE: An empty DIMM socket is marked as "_". For the best performance, all the DIMMs installed must be of the same speed, capacity, and the DIMMs must be from one manufacturer.

Removing Memory Modules

WARNING: The memory modules are hot to touch for some time after the system has been powered down. Allow time for the memory modules to cool before handling them. Handle the memory modules by the card edges and avoid touching the components on the memory module.

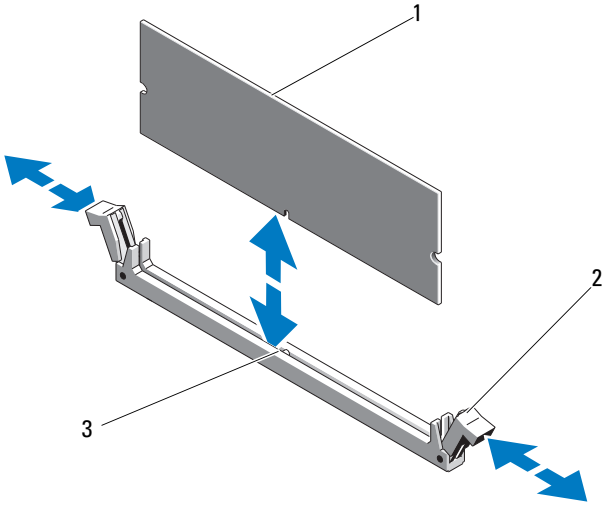
CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Open the system. See "Opening the System" on page 58.
3. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 60.
4. Locate the memory module sockets.
5. Press down and out on the ejectors on each end of the socket until the memory module pops out of the socket. See Figure 3-10.

CAUTION: Handle each memory module only on either card edge, making sure not to touch the middle of the memory module.

6. Lift out the memory module.
7. Replace the cooling shroud. See "Installing the Cooling Shroud" on page 61.
8. Close the system. See "Closing the System" on page 59.
9. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.

Figure 3-10. Removing and Installing a Memory Module



1	memory module	2	memory module socket ejectors (2)
3	alignment key		

Installing Memory Modules

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Locate the memory module sockets. See Figure 5-3.
2. Press the ejectors on the memory module socket down and out, as shown in Figure 3-10, to allow the memory module to be inserted into the socket.

   Handle each memory module only on either card edge, making sure not to touch the middle of the memory module.
3. Align the memory module's edge connector with the alignment key of the memory module socket, and insert the memory module in the socket.

NOTE: The memory module socket has an alignment key that allows you to install the memory module in the socket in only one way.

4 Press down on the memory module with your thumbs until the ejectors lock into position. See Figure 3-10.

When the memory module is properly seated in the socket, the ejectors on the memory module socket align with the ejectors on the other sockets that have memory modules installed.

5 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 61.

6 Close the system. See "Closing the System" on page 59.

7 Reconnect your system and peripherals to their electrical outlets, and turn on the system.

8 Start up the system, press <F2> to enter the System Setup program, and check the **System Memory** settings on the main System Setup screen.

The system should have already changed the value to reflect the newly installed memory.

9 If the value is incorrect, one or more of the memory modules may not be installed properly. Repeat step 3 through step 8 of this procedure, checking to ensure that the memory modules are firmly seated in their sockets.

Expansion-Card Riser and Expansion Card

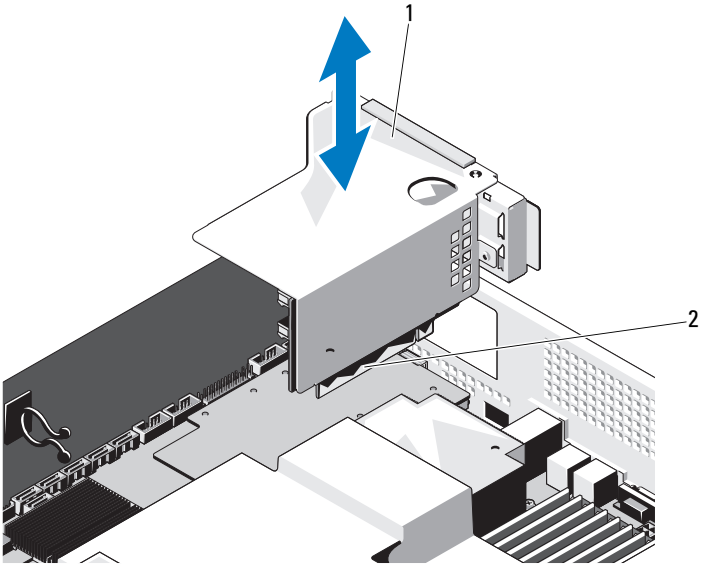
CAUTION: Expansion cards can only be installed in the slots on the expansion-card riser. Do not attempt to install expansion cards directly into the riser connector on the system board.

Removing the Expansion-Card Riser

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

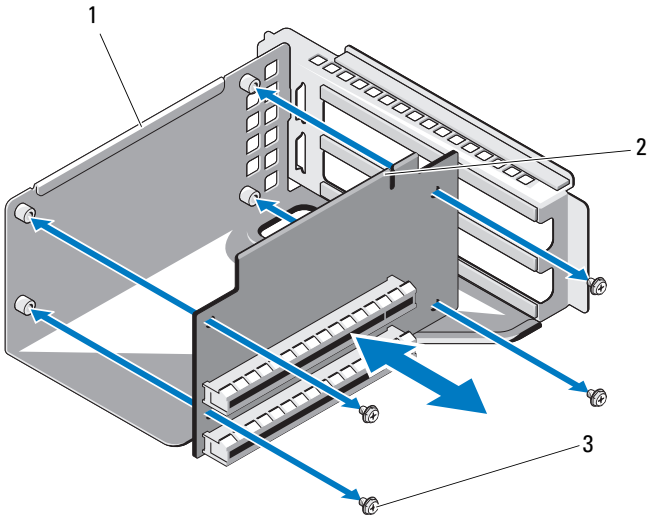
1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Open the system. See "Opening the System" on page 58.
3. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 60.
4. Grasp the expansion-card riser assembly firmly and pull it out from the connector on the system board. See Figure 3-11.
5. Lift the expansion-card riser assembly out of the system board. See Figure 3-11.
6. Remove the four securing screws on the expansion-card riser assembly and slide the expansion card riser out. See Figure 3-12.

Figure 3-11. Removing and Installing the Expansion-Card Riser Assembly



1	expansion-card riser assembly	2	expansion-card riser assembly connector

Figure 3-12. Removing and Installing the Expansion-Card Riser



1 expansion-card riser assembly 2 expansion-card riser

3 screws (4)

Installing the Expansion-Card Riser

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Replace the expansion-card riser in the expansion-card riser assembly and secure it using the four screws. See Figure 3-12.
2. Align the expansion-card riser assembly with the connector on the system board. See Figure 3-11.
3. Seat the expansion-card riser assembly firmly on the system board.
4. Replace the cooling shroud. See "Installing the Cooling Shroud" on page 61.

5 Replace the system cover. See "Closing the System" on page 59.

6 Reconnect the system and peripherals to their electrical outlets, and turn on the system.

Removing the Expansion Card

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1 Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

2 Open the system. See "Opening the System" on page 58.

3 Remove the cooling shroud. See "Removing the Cooling Shroud" on page 60.

4 Remove the expansion-card riser. See "Removing the Expansion-Card Riser" on page 74.

5 Remove the screw that secures the expansion card to the expansion-card riser assembly. See Figure 3-13.

6 Pull out the expansion card from the expansion-card riser. See Figure 3-13.

CAUTION: Disconnecting the RAID battery cable from a PERC card can cause data loss if the "dirty cache" LED on the card is lit. The LED indicates that data is still cached in controller memory and the data was not cleared at system shutdown. Remove the RAID controller and raid battery as a set when the LED is lit.

7 If removing a PERC RAID controller card, disconnect the RAID battery cable from the expansion card.

NOTE: You must install a filler bracket over an empty expansion slot to maintain Federal Communications Commission (FCC) certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

8 Insert the filler bracket.

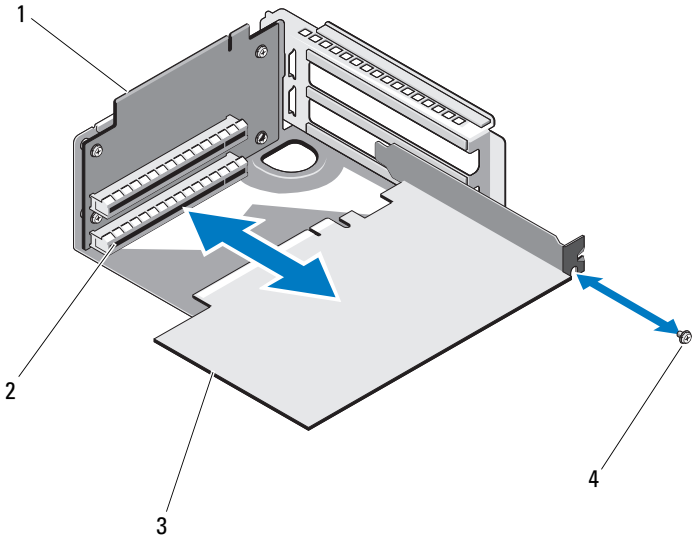
NOTE: Keep this bracket in case you need to remove the expansion card. Filler brackets must be installed over empty expansion-card slots to maintain FCC certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

9 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 61.

10 Replace the system cover. See "Closing the System" on page 59.

11 Reconnect the system and peripherals to their electrical outlets, and turn on the system.

Figure 3-13. Removing and Installing the Expansion Card



1	expansion-card riser	2	expansion-card connector
3	expansion card	4	screw

Installing the Expansion Card

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Open the system. See "Opening the System" on page 58.
3. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 60.
4. If applicable, remove the filler bracket.
5. Align the expansion card with the riser guide slot and push it in the direction of the arrow until the card is firmly seated in the card connector. See Figure 3-13.
6. For a battery-cached RAID controller, connect the RAID battery cable to the expansion card.
7. Close the system. See "Closing the System" on page 59.
8. Reconnect your system and peripherals to their electrical outlets, and turn on the system.

Integrated Storage Controller Cards

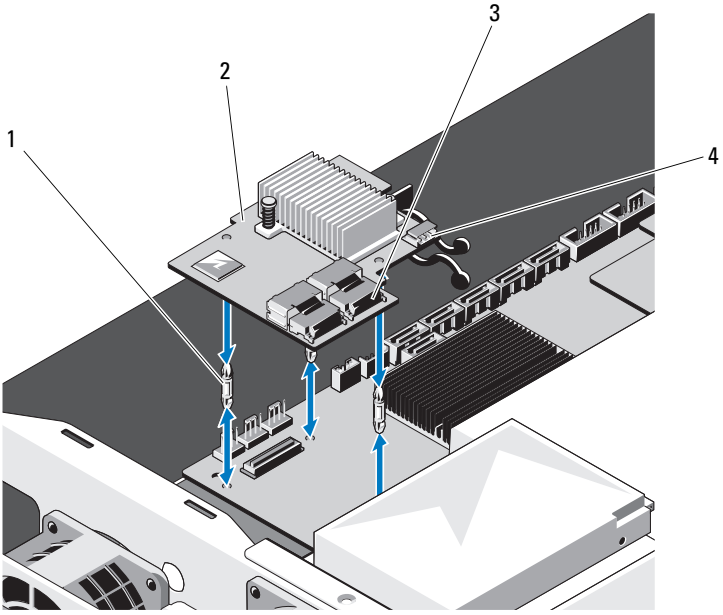
Your system includes a dedicated expansion-card slot on the system board for an integrated SAS controller card that provides the integrated storage subsystem for your system's hard drives. The controller supports SAS, SATA, and SSD hard drives and also enables you to set up the hard drives in RAID configurations as supported by the version of the storage controller included with your system.

Removing the Integrated Storage Controller Card

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Open the system. See "Opening the System" on page 58.
3. Disconnect the SAS cables connected to the storage controller card.
4. Lift the integrated storage controller card to remove it from the system board.
5. Remove the three spacer pins and store them securely for later use. See Figure 3-14.

Figure 3-14. Removing and Installing the Integrated Storage Controller Card



1	spacer pins (3)	2	integrated storage controller card
3	SAS cable connector	4	RAID battery connector

Installing the Integrated Storage Controller Card

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Open the system. See "Opening the System" on page 58.
3. Place the three spacer pins on the system board. See Figure 3-14.

4 Install the integrated storage controller card in place. See Figure 3-14.

5 Connect the SAS data cable to the integrated storage controller card.

6 Close the system. See "Closing the System" on page 59.

7 Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

RAID Battery (Optional)

NOTE: The information in this section applies only to systems with the optional RAID controller card.

Removing a RAID Battery

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1 Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

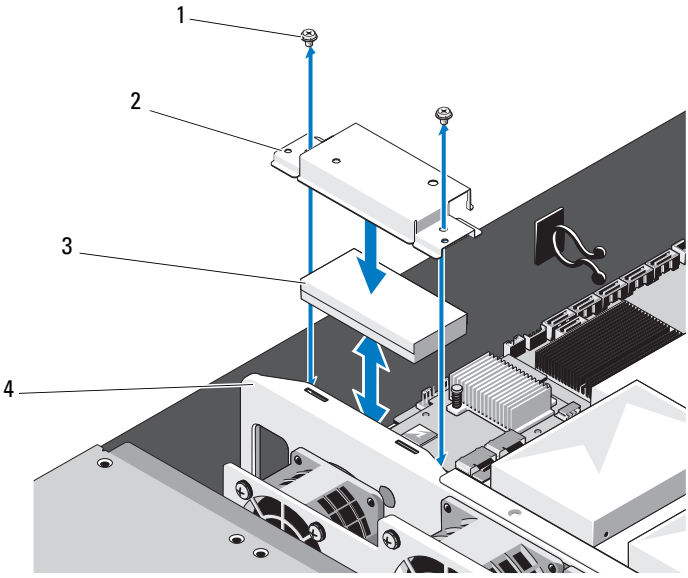
2 Open the system. See "Opening the System" on page 58.

3 Locate the RAID battery carrier and remove the two screws that secure the RAID battery carrier on to the chassis. See Figure 3-15.

4 Pull back gently on the right edge of the battery bay and draw out the RAID battery from the battery carrier.

5 Disconnect the cable between the RAID battery and the storage controller card. See Figure 3-15.

Figure 3-15. Removing and Installing a RAID Battery



1	screws (2)	2	RAID battery carrier
3	RAID battery	4	cooling fan assembly

Installing a RAID Battery

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Connect the RAID battery cable to the connector on the RAID battery.
2. With the cable oriented toward the back, angle the left side of the RAID battery into the left side of the battery carrier.
3. Secure the RAID battery into the battery carrier.

4 Secure the RAID battery carrier onto the chassis using the two screws. See Figure 3-15.

5 Connect the RAID battery cable to the RAID battery connector on the storage controller card. See Figure 3-14.

6 Close the system. See "Closing the System" on page 59.

7 Reconnect your system and peripherals to their electrical outlets, and turn on the system.

Dual RAID Battery (Optional)

NOTE: The information in this section applies only to systems with the optional RAID controller card.

Removing a Dual RAID Battery

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1 Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

2 Open the system. See "Opening the System" on page 58.

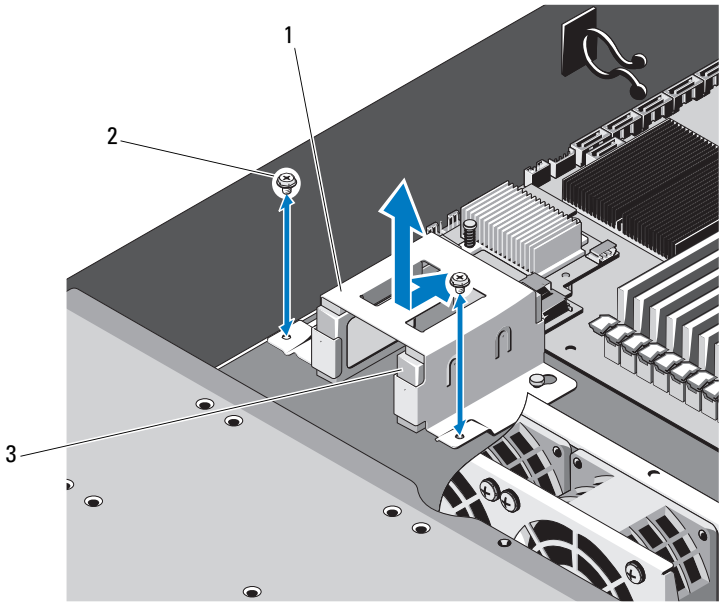
3 Locate the dual RAID battery carrier and remove the two screws that secure the battery carrier on to the chassis. See Figure 3-16.

4 Disconnect the cable between the RAID battery and the storage controller card. See Figure 3-15.

5 Slide the dual RAID battery carrier slightly toward the front of the system and lift it away from the system. See Figure 3-16.

6 Gently push the RAID batteries inside the battery carrier to free them of the battery carrier. See Figure 3-17.

Figure 3-16. Removing and Installing the Dual RAID Battery Cage

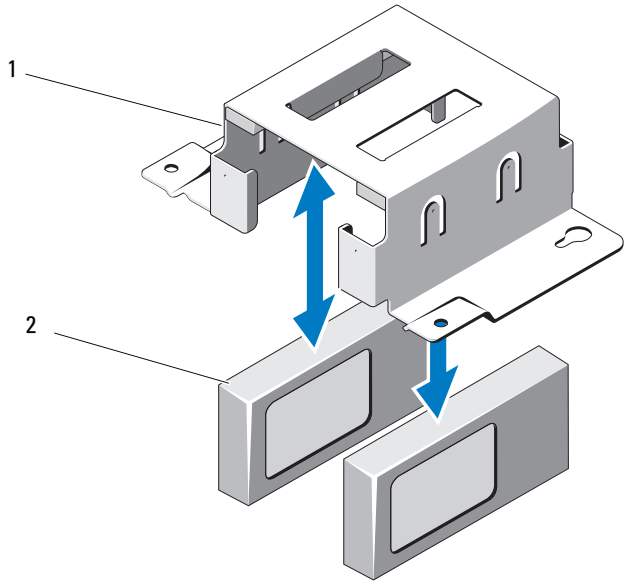


1 RAID battery carrier

2 screws (2)

3 RAID batteries (2)

Figure 3-17. Removing and Installing a Dual RAID Battery From the Battery Carrier



1 dual RAID battery carrier 2 RAID batteries (2)

Installing a RAID Battery

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Connect the RAID battery cables to the connectors on the RAID batteries.
2. With the cables oriented toward the back, secure the RAID batteries into the battery carrier. See Figure 3-17.
3. Affix the RAID battery carrier onto the chassis using the two screws. See Figure 3-16.

4 Connect the RAID battery cable to the RAID battery connector on the storage controller card. See Figure 3-14.

5 Close the system. See "Closing the System" on page 59.

6 Reconnect your system and peripherals to their electrical outlets, and turn on the system.

Mezzanine Card (10 GbE LAN)

Removing the Mezzanine Card (10 GbE LAN)

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1 Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

2 Open the system. See "Opening the System" on page 58.

3 Remove the cooling shroud. See "Removing the Cooling Shroud" on page 60.

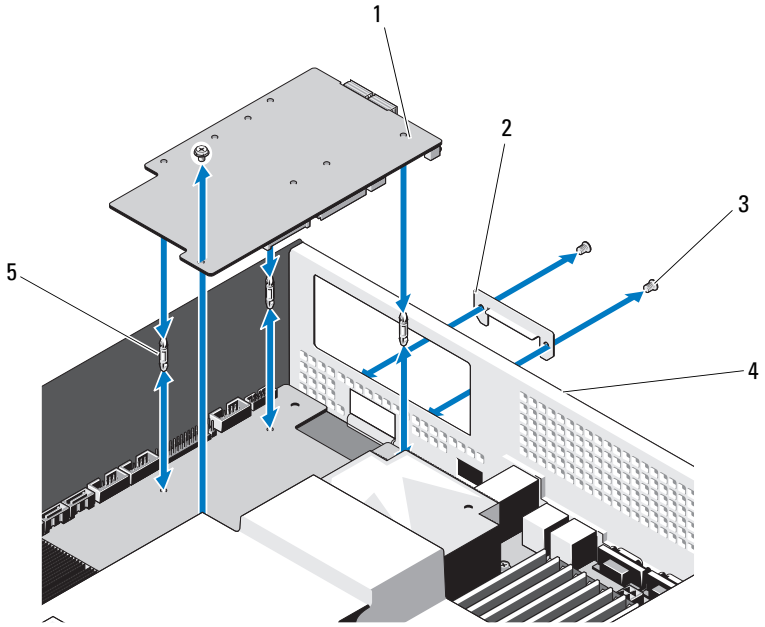
4 Remove the expansion-card riser assembly. See "Removing the Expansion-Card Riser" on page 74.

5 Remove the three spacer pins and the screw on the mezzanine card.

6 Remove the two screws securing the bracket and remove the card. See Figure 3-18.

7 If you are not installing another mezzanine card, install the mezzanine-card cover and secure with two screws. See Figure 3-18.

Figure 3-18. Removing and Installing the Mezzanine Card (10 GbE LAN)



1	mezzanine card (10 GbE LAN)	2	mezzanine-card cover
3	screws (3)	4	back panel
5	spacer pins (3)		

Installing the Mezzanine Card (10 GbE LAN)

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. If you are installing a mezzanine card for the first time, remove the two screws securing the mezzanine-card cover and remove the cover. See Figure 3-18.
2. Install a label bracket that has slots for connecting the mezzanine cards.
3. Align the spacer pins on the mezzanine card with the holes on the system board.

   NOTE: The three spacer pins must be inserted through the board for proper installation of the mezzanine card.
4. Secure the board using the screw. See Figure 3-18.
5. Replace the expansion-card riser assembly. See "Installing the Expansion-Card Riser" on page 76.
6. Replace the cooling shroud. See "Installing the Cooling Shroud" on page 61.
7. Replace the system cover. See "Closing the System" on page 59.
8. Reconnect the system and peripherals to their electrical outlets, and turn on the system.

Power Supplies

WARNING: Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

Removing the Power Supply

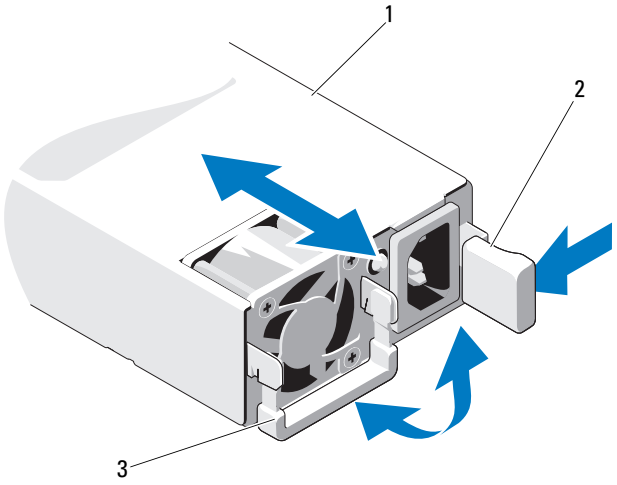
WARNING: In order to reduce the risk of injury from electric shock, disconnect the failed power supply from the AC power before removing it from the system.

CAUTION: The system requires one power supply to operate the system normally. Remove and replace only one power supply at a time.

1. Disconnect the power cable from the power supply.
2. Press the lever release latch of the power supply and slide out the power supply using the power supply handle. See Figure 3-19.

NOTE: Install a power supply blank if you are not replacing the power supply.

Figure 3-19. Removing and Installing the Power Supply



1	power supply	2	release latch
3	power supply handle		

Installing the Power Supply

1. Verify that both power supplies are of the same type and have the same maximum output power.
2. Slide the new power supply into the system until the power supply is fully seated and the release latch snaps into place. See Figure 3-19.
3. Reconnect your system and peripherals to their electrical outlets, and turn on the system.

NOTE: When installing, hot-swapping, or hot-adding a new power supply in a system with two power supplies, allow several seconds for the system to recognize the power supply and determine its status. The power-supply status indicator turns green to signify that the power supply is functioning properly. See Figure 1-3.

Removing the Power Supply Blank

CAUTION: To ensure proper system cooling, the power supply blank must be installed in power supply bay PS2 in a non-redundant configuration. Remove the power supply blank only if you are installing a second power supply.

To remove the power supply blank, remove the screw and pull outward on the blank.

Installing the Power Supply Blank

NOTE: Install the power supply blank only in power supply bay 2.

Align the blank with the power supply bay and insert the blank into the chassis until it clicks into place. Secure with screw.

Power Distribution Board

WARNING: Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

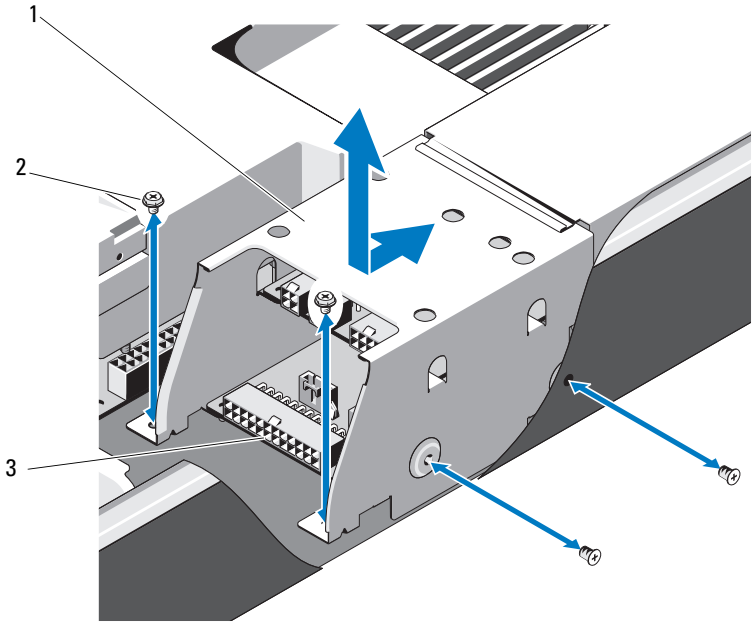
CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

The power distribution board comes as a power distribution board assembly with two power distribution boards.

Removing the Power Distribution Board Assembly

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Remove the system from the rack and place on a flat surface.
3. Remove the right side rail from the chassis.
4. Remove the two screws on the side of the chassis. See Figure 3-20.
5. Open the system. See "Opening the System" on page 58.
6. Disconnect all the power cables from the power distribution board.
7. Remove the two screws that secure the power distribution board assembly to the bottom of the chassis. See Figure 3-20.

Figure 3-20. Removing and Installing the Power Distribution Board Assembly



1 power distribution board assembly 2 screws (4)

3 power distribution boards (2)

Installing the Power Distribution Board Assembly

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1 Place the power distribution board assembly into the system and align the slots on the power distribution board assembly with the slots on the chassis.

2 Replace the two screws that secure the power distribution board assembly to the bottom of the chassis.

3 Connect all the power cables. See Figure 3-20.

4 Replace the system cover. See "Closing the System" on page 59.

5 Replace the two screws on the right side of the chassis.

6 Replace the right side rail.

7 Reconnect the system and peripherals to their electrical outlets, and turn on the system.

Cooling Fans

WARNING: The cooling fan can continue to spin for some time after the system has been powered down. Allow time for the fan to stop spinning before removing it from the system.

WARNING: Do not attempt to operate the system without the cooling fans.

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

Removing a Cooling Fan Assembly

1 Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

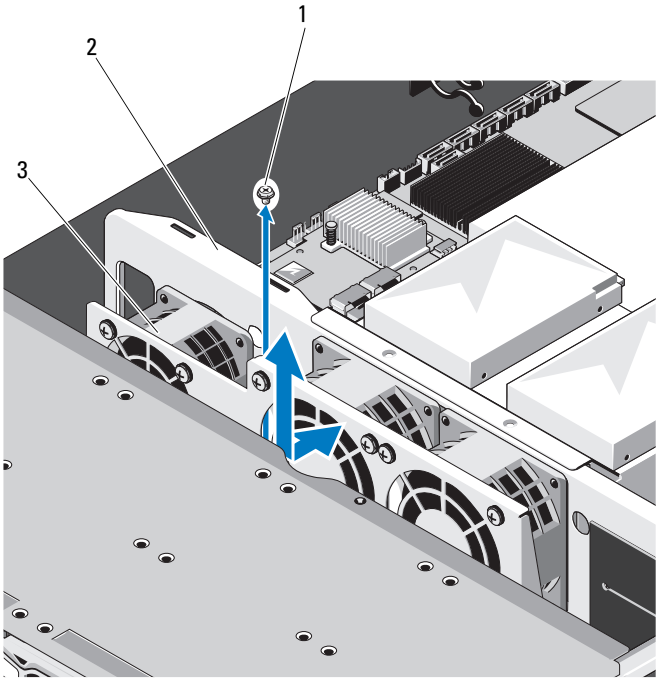
2 Open the system. See "Opening the System" on page 58.

3 Disconnect the three power cables from the backplane. See Figure 5-4.

4 Remove the single screw that secures the fan assembly to the chassis. See Figure 3-21.

5 Slide the fan assembly slightly toward the front of the system and lift it away from the system. See Figure 3-21.

Figure 3-21. Removing and Installing the Fan Assembly



1 screw
2 fan assembly
3 cooling fans (3)

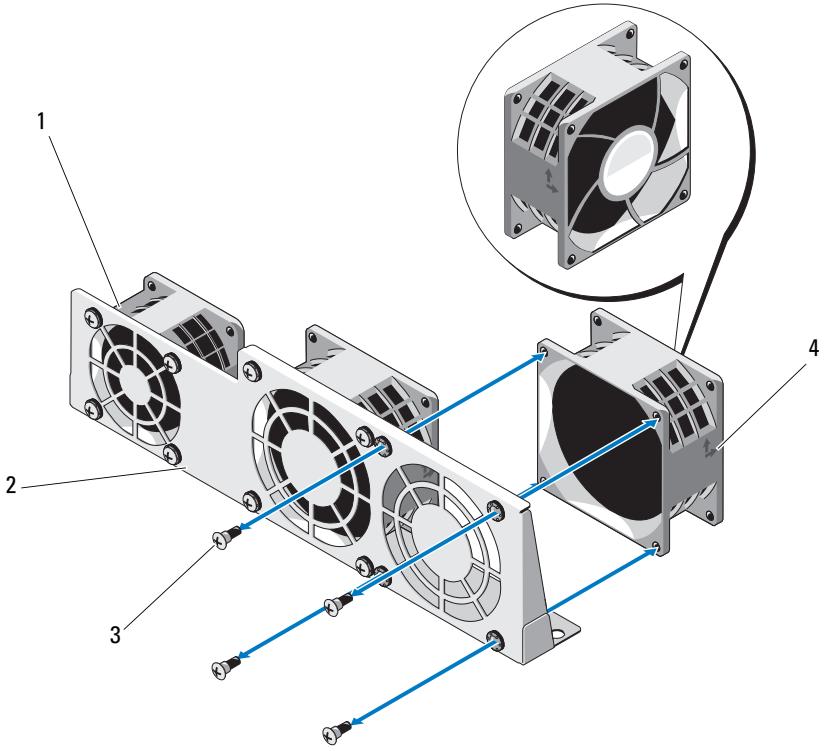
Installing the Cooling Fan Assembly

1. Place the fan assembly into the system and slide the fan assembly slightly toward the back of the system.
2. Align the slot on the fan assembly with the slot on the chassis.
3. Replace the screw that secures the fan assembly to the chassis.
4. Connect the power cables to the cooling fans. See Figure 3-21.
5. Replace the system cover. See "Closing the System" on page 59.
6. Reconnect the system and peripherals to their electrical outlets, and turn on the system.

Removing the Fan Module

Remove the four screws that secure the fan module to the fan assembly and separate the fan module from the fan assembly. See Figure 3-22.

Figure 3-22. Removing and Installing the Fan Module



1	cooling fans (3)	2	fan assembly
3	screws (4 each)	4	air flow direction

Installing the Fan Module

NOTE: Note the direction of airflow on the fan modules and ensure that the fan modules are oriented in the correct direction while installing.

Align the slots on the fan module with the slots on the fan assembly such that the labelled side faces the back of the system. Secure the fan module to the fan assembly using the screws. See Figure 3-22.

Backplane

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

Removing the Backplane

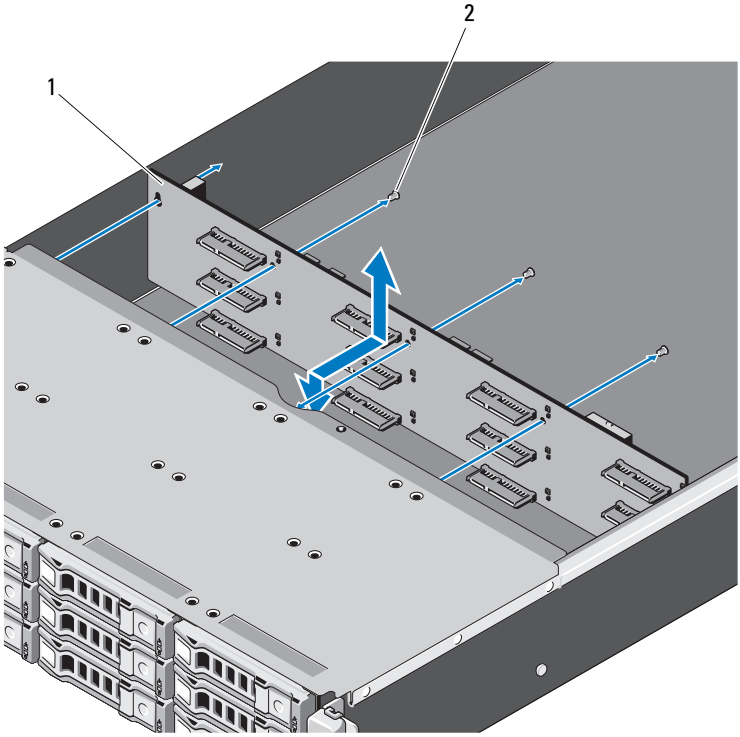
1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Open the system. See "Opening the System" on page 58.
3. Remove the cooling fan assembly. See "Removing a Cooling Fan Assembly" on page 94.
4. Disconnect the SAS/SATA cables, the fan cables, and the power cables from the backplane. See Figure 5-4.

CAUTION: To prevent damage to the drives and backplane, you must remove the hard drives from the system before removing the backplane.

CAUTION: You must note the number of each hard drive and temporarily label them before removal so that you can replace them in the same locations.

5. Remove all the hard drives. See "Removing a Hard-Drive Carrier" on page 54.
6. Remove the three screws that secure the backplane to the system. See Figure 3-23.
7. Slide the backplane and lift it clear off the system.

Figure 3-23. Removing and Installing the Backplane



1 backplane 2 screws (3)

Installing the Backplane

1. Insert the backplane in the direction of the arrow until it is seated in the system.
2. Secure the backplane to the system using the three screws.
3. Replace all the hard drives in the system. See "Installing a Hard-Drive Carrier" on page 55.
4. Replace the cooling fan assembly. "Installing the Cooling Fan Assembly" on page 95.
5. Connect the SAS/SATA cables, the fan cables, and the power cable. See Figure 5-4.
6. Replace the cooling shroud. See "Installing the Cooling Shroud" on page 61.
7. Replace the system cover. See "Closing the System" on page 59.
8. Reconnect the system and peripherals to their electrical outlets, and turn on the system.

Control Panel Assembly

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

Removing the Control Panel Assembly

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Open the system. See "Opening the System" on page 58.
3. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 60.
4. Slide the cable cover on the side of the system, toward the back of the system to remove it.

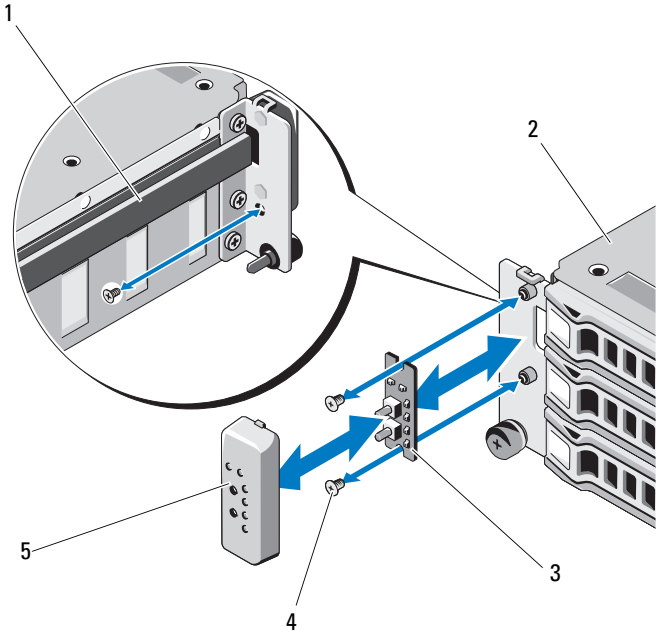
5 Disconnect the LED signal cable from the front panel connector on the system board. See Figure 5-3.

6 Remove the screw securing the LED panel cover to the chassis and slide the cover out. See Figure 3-24.

7 Remove the two screws securing the control panel assembly to the chassis. See Figure 3-24.

8 Remove the control panel assembly.

Figure 3-24. Removing the Control Panel Assembly



1 cable cover
2 chassis
3 front LED board
4 screws (3)
5 front LED cover

Installing the Control Panel Assembly

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Place the control panel assembly onto the front of the system and secure in place with the two screws.
2. Replace the control panel assembly cover and secure it with the screw.
3. Connect the LED signal cable to the front panel connector on the system board. See Figure 5-3.
4. Replace the cable cover making sure that the cables are not crimped.
5. Replace the cooling shroud. See "Installing the Cooling Shroud" on page 61.
6. Replace the system cover. See "Closing the System" on page 59.
7. Reconnect the system and peripherals to their electrical outlets, and turn on the system.

System Battery

Removing the System Battery

WARNING: There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. See your safety information for additional information.

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Open the system. See "Opening the System" on page 58.

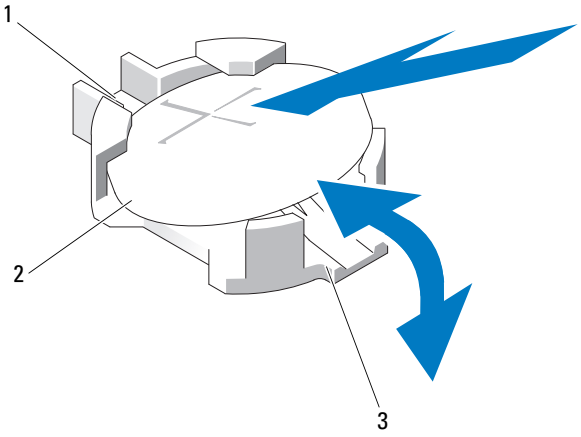
3 Remove the cooling shroud. See "Removing the Cooling Shroud" on page 60.

4 Locate the battery socket. See "System Board Connectors" on page 125.

CAUTION: To avoid damage to the battery connector, you must firmly support the connector while installing or removing a battery.

5 Slide the battery toward the positive side of the connector and lift it out of the securing tabs at the negative side of the connector.

Figure 3-25. Removing and Installing the System Battery



1 positive side of battery connector
2 system battery
3 negative side of battery connector

Installing the System Battery

1 Hold the battery with the "+" facing up, and slide it under the securing tabs at the positive side of the connector.

2 Press the battery straight down into the connector until it snaps into place.

3 Install the cooling shroud. See "Installing the Cooling Shroud" on page 61.

4 Close the system. See "Closing the System" on page 59.

5 Reconnect the system to the electrical outlet and turn the system on, including any attached peripherals.

6 Enter the System Setup program to confirm that the battery is operating properly. See "Using the System Setup Program" on page 37.

7 Enter the correct time and date in the System Setup program's **Time** and **Date** fields, and re-enter any customized option settings as needed.

8 Exit the System Setup program.

System Board

WARNING: Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

Removing the System Board

1 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

2 Open the system. See "Opening the System" on page 58.

3 Remove the cooling shroud. See "Removing the Cooling Shroud" on page 60.

4 Remove all memory modules. See "Removing Memory Modules" on page 71.

5 Remove the expansion card-riser. See "Removing the Expansion-Card Riser" on page 74.

6 Remove the heat sinks. See "Removing the Heat Sink" on page 62.

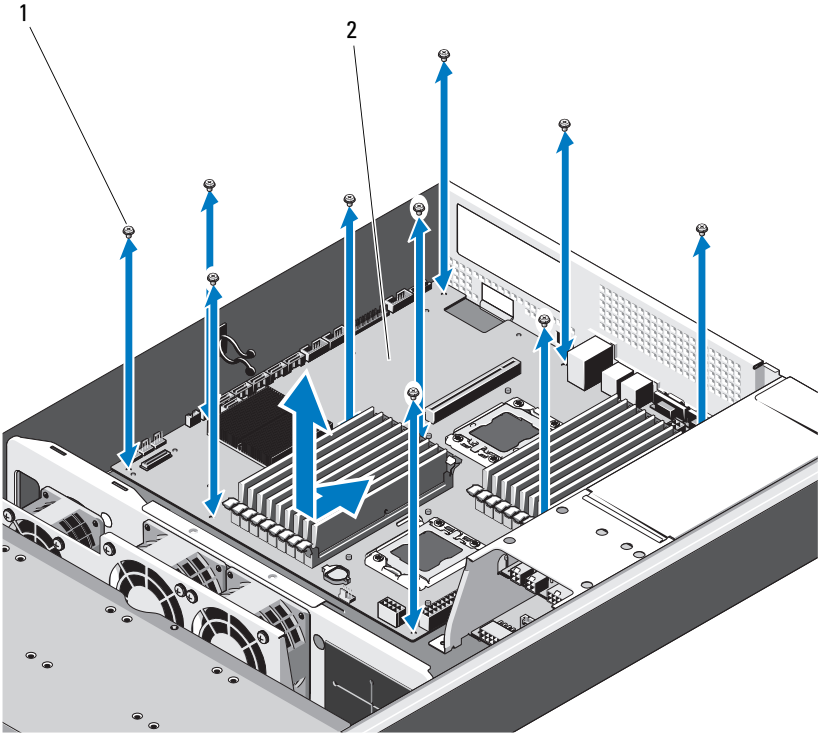
7 Remove the processors. See "Removing the Processor" on page 64.

8 Disconnect the power, SATA, and front panel cables from the system board.

CAUTION: Do not lift the system board assembly by grasping a memory module, processor, or other components.

9 Loosen the ten screws securing the system board, and then slide the board toward the front, up and out of the system. See Figure 3-26.

Figure 3-26. Removing and Installing the System Board



1 screws (10) 2 system board assembly

Installing the System Board

1 Align the holes A and B on the system board to position the board correctly in the system.

2 Replace the ten screws to secure the system board in place.

3 Reconnect the power, SATA, and front panel cables to the system board. See "System Board Connectors" on page 125.

4 Replace the processors. See "Installing the Processor" on page 66.

5 Replace the heat sinks. See "Installing the Heat Sink" on page 64.

6 Replace the expansion-card riser assembly. See "Installing the Expansion-Card Riser" on page 76.

7 Replace the memory modules. See "Installing Memory Modules" on page 72.

8 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 61.

9 Replace the system cover. See "Closing the System" on page 59.

10 Reconnect the system and peripherals to their electrical outlets, and turn on the system.

4

Troubleshooting Your System

Safety First—For You and Your System

WARNING: Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

WARNING: Before removing the system cover, disconnect all power, then unplug the AC power cord, and then disconnect all peripherals, and all LAN lines.

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

Installation Problems

Perform the following checks if you are troubleshooting an installation problem:

- Check all cable and power connections (including all rack cable connections).
- Unplug the power cord and wait for one minute. Then reconnect the power cord and try again.
- If the network is reporting an error, verify that the system has enough memory and disk space.
- Remove all added peripherals, one at a time, and try to turn on the system. If after removing a peripheral the system works, it may be a problem with the peripheral or a configuration problem between the peripheral and the system. Contact the peripheral vendor for assistance.
- If the system does not power on, check the LED display. If the power LED is not on, you may not be receiving AC power. Check the AC power cord to make sure that it is securely connected.

Troubleshooting System Startup Failure

If your system halts during startup prior to video imaging, especially after installing an operating system or reconfiguring your system's hardware, see "System Memory" on page 67.

For all other startup issues, note the LED panel indicators and any system messages that appear on screen. For more information, see "Power and System Board Status Codes" on page 17 for more information.

Troubleshooting External Connections

Ensure that all external cables are securely attached to the external connectors on your system before troubleshooting any external devices. See Figure 1-1 and Figure 1-3 for the front- and back-panel connectors on your system.

Troubleshooting the Video Subsystem

1. Check the system and power connections to the monitor.
2. Check the video interface cabling from the system to the monitor.

Troubleshooting a USB Device

Use the following steps to troubleshoot a USB keyboard and/or mouse. For other USB devices, go to step 5.

1. Disconnect the keyboard and mouse cables from the system briefly and reconnect them.
2. Connect the keyboard/mouse to the USB port(s) on the opposite side of the system.
3. If the problem is resolved, restart the system, enter the System Setup program, and check if the nonfunctioning USB ports are enabled.
4. Replace the keyboard/mouse with another working keyboard/mouse.

   If the problem is resolved, replace the faulty keyboard/mouse.

   If the problem is not resolved, proceed to the next step to begin troubleshooting the other USB devices attached to the system.

5 Turn off all attached USB devices and disconnect them from the system.

6 Restart the system and, if your keyboard is functioning, enter the system setup program. Verify that all USB ports are enabled. See "USB Configuration" on page 43.

If your keyboard is not functioning, you can also use remote access. If the system is not accessible, see "Jumper Settings" on page 123 for instructions on setting the NVRAM_CLR jumper inside your system and restoring the BIOS to the default settings.

7 Reconnect and turn on each USB device one at a time.

8 If a device causes the same problem, turn off the device, replace the USB cable, and turn on the device.

If the problem persists, replace the device.

If all troubleshooting fails, see "Getting Help" on page 131.

Troubleshooting a Serial I/O Device

1 Turn off the system and any peripheral devices connected to the serial port.

2 Swap the serial interface cable with another working cable, and turn on the system and the serial device.

If the problem is resolved, replace the interface cable.

3 Turn off the system and the serial device, and swap the device with a comparable device.

4 Turn on the system and the serial device.

If the problem is resolved, replace the serial device.

If the problem persists, see "Getting Help" on page 131.

Troubleshooting a NIC

1. Restart the system and check for any system messages pertaining to the NIC controller.
2. Check the appropriate indicator on the NIC connector. See "NIC Indicator Codes" on page 15.
   - If the link indicator does not light, check all cable connections.
   - If the activity indicator does not light, the network driver files might be damaged or missing.

     Remove and reinstall the drivers if applicable. See the NIC's documentation.
   - Change the auto-negotiation setting, if possible.
   - Use another connector on the switch or hub.

   If you are using a NIC card instead of an integrated NIC, see the documentation for the NIC card.
3. Ensure that the appropriate drivers are installed and the protocols are bound. See the NIC's documentation.
4. Enter the System Setup program and confirm that the NIC ports are enabled. See "NIC Indicator Codes—iBMC" on page 16.
5. Ensure that the NICs, hubs, and switches on the network are all set to the same data transmission speed. See the documentation for each network device.
6. Ensure that all network cables are of the proper type and do not exceed the maximum length.

   If all troubleshooting fails, see "Getting Help" on page 131.

Troubleshooting a Wet System

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Open the system. See "Opening the System" on page 58.
3. Disassemble components from the system. See "Installing System Components" on page 51.
   - Cooling shroud
   - Hard drives
   - Backplane
   - Expansion-card riser
   - Power supplies
   - Fans
   - Processors and heat sinks
   - Memory modules
4. Let the system dry thoroughly for at least 24 hours.
5. Reinstall the components you removed in step 3.
6. Close the system. See "Closing the System" on page 59.
7. Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.

   If the system does not start properly, see "Getting Help" on page 131.
8. If the system starts properly, shut down the system and reinstall all of the expansion cards that you removed. See "Installing the Expansion Card" on page 79.
9. If the system fails to start, see "Getting Help" on page 131.

Troubleshooting a Damaged System

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Open the system. See "Opening the System" on page 58.
3. Ensure that the following components are properly installed:
   - Expansion-card riser
   - Power supplies
   - Fans
   - Hard drives
   - Processors and heat sinks
   - Memory modules
   - Cooling shroud
4. Ensure that all cables are properly connected.
5. Close the system. See "Closing the System" on page 59.
6. If the system fails to start, see "Getting Help" on page 131.

Troubleshooting the System Battery

NOTE: If the system is turned off for long periods of time (for weeks or months), the NVRAM may lose its system configuration information. This situation is caused by a defective battery.

1. Re-enter the time and date through the System Setup program. See "System Setup Options at Boot" on page 38.
2. Turn off the system and disconnect it from the electrical outlet for at least one hour.
3. Reconnect the system to the electrical outlet and turn on the system.

4 Enter the System Setup program.

If the date and time are not correct in the System Setup program, replace the battery. See "Installing the System Battery" on page 102.

If the problem is not resolved by replacing the battery, see "Getting Help" on page 131.

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

NOTE: Some software may cause the system time to speed up or slow down. If the system seems to operate normally except for the time kept in the System Setup program, the problem may be caused by software rather than by a defective battery.

Troubleshooting Power Supplies

1 Identify the faulty power supply by the power supply's fault indicator. See "Power and System Board Status Codes" on page 17.

CAUTION: At least one power supply must be installed for the system to operate. Operating the system with only one power supply installed for extended periods of time can cause the system to overheat.

2 Reseat the power supply by removing and reinstalling it. See "Installing the Power Supply" on page 91 or "Removing the Power Supply" on page 90.

NOTE: After installing a power supply, allow several seconds for the system to recognize the power supply and to determine if it is working properly. The power indicator turns green to signify that the power supply is functioning properly.

If the problem persists, replace the faulty power supply.

3 If all troubleshooting fails, see "Getting Help" on page 131.

Troubleshooting System Cooling Problems

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

Ensure that none of the following conditions exist:

- System cover, cooling shroud, drive blank, power supply blank, or front or back filler panel is removed.
- Ambient temperature is too high.
- External airflow is obstructed.
- Cables inside the system obstruct airflow.
- An individual cooling fan is removed or has failed. See "Troubleshooting a Fan" on page 114.

Troubleshooting a Fan

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Locate the faulty fan indicated by the LED panel.
2. Turn off the system and all attached peripherals.
3. Open the system. See "Opening the System" on page 58.
4. Reseat the fan's power cable.
5. Restart the system.

   If the fan functions properly, close the system. See "Closing the System" on page 59.

6 If the fan does not function, turn off the system and install a new fan. See "Installing the Cooling Fan Assembly" on page 95.

7 Restart the system.

If the problem is resolved, close the system. See "Closing the System" on page 59.

If the replacement fan does not operate, see "Getting Help" on page 131.

Troubleshooting System Memory

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

NOTE: Invalid memory configurations can cause your system to halt at startup without video output. See "General Memory Module Installation Guidelines" on page 68 and verify that your memory configuration complies with all applicable guidelines.

1 If the system is not operational, turn off the system and attached peripherals, and unplug the system from the power source. Wait at least 10 seconds and then reconnect the system to power.

2 Turn on the system and attached peripherals and note the messages on the screen.

Go to step 13 if an error message appears indicating a fault with a specific memory module.

3 Enter the System Setup program and check the system memory setting. See "Memory Configuration" on page 42. Make any changes to the memory settings, if needed.

If the memory settings match the installed memory but a problem is still indicated, go to step 13.

4 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

5 Open the system. See "Opening the System" on page 58.

6 Remove the cooling shroud. See "Removing the Cooling Shroud" on page 60.

7 Check the memory channels and ensure that they are populated correctly. See "General Memory Module Installation Guidelines" on page 68.

8 Reseat the memory modules in their sockets. See "Installing Memory Modules" on page 72.

9 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 61.

10 Close the system. See "Closing the System" on page 59.

11 Reconnect the system to its electrical outlet, and turn on the system and attached peripherals.

12 Enter the System Setup program and check the system memory setting. See "System Memory Settings" on page 40.

If the problem is not resolved, proceed with the next step.

13 Turn off the system and attached peripherals, and disconnect the system from the power source.

14 Open the system. See "Opening the System" on page 58.

15 If an error message indicates a specific memory module as faulty, swap or replace the module.

16 To troubleshoot an unspecified faulty memory module, replace the memory module in the first DIMM socket with a module of the same type and capacity. See "Installing Memory Modules" on page 72.

17 Close the system. See "Closing the System" on page 59.

18 Reconnect the system to its electrical outlet, and turn on the system and attached peripherals.

19 As the system boots, observe any error message that appears and the LED indicators on the front of the system.

20 If the memory problem is still indicated, repeat step 13 through step 19 for each memory module installed.

If the problem persists after all memory modules have been checked, see "Getting Help" on page 131.

Troubleshooting a Hard Drive

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

CAUTION: This troubleshooting procedure can destroy data stored on the hard drive. Before you proceed, back up all files on the hard drive.

1. If your system has a RAID controller and your hard drives are configured in a RAID array, perform the following steps:
   a. Restart the system and enter the host adapter configuration utility program by pressing <Ctrl><R> for a PERC controller or <Ctrl><C> for a SAS controller.

      See the documentation supplied with the host adapter for information about the configuration utility.

   b. Ensure that the hard drive(s) have been configured correctly for the RAID array.

   c. Take the hard drive offline and reseat the drive. See "Removing a Hard-Drive Carrier" on page 54

   d. Exit the configuration utility and allow the system to boot to the operating system.
2. Ensure that the required device drivers for your controller card are installed and are configured correctly. See the operating system documentation for more information.
3. Restart the system, enter the System Setup program, and verify that the controller is enabled and the drives appear in the System Setup program. See "Using the System Setup Program" on page 37.

   If the problem persists, see "Getting Help" on page 131.

Troubleshooting a Storage Controller

NOTE: When troubleshooting a SAS or SAS RAID controller, also see the documentation for your operating system and the controller.

1. Enter the System Setup program and ensure that the SAS controller is enabled. See "System Setup Options at Boot" on page 38.
2. Restart the system and press the applicable key sequence to enter the configuration utility program.
   - <Ctrl><C> for a SAS controller
   - <Ctrl><R> for a RAID controller

   See the controller's documentation for information about configuration settings.
3. Check the configuration settings, make any necessary corrections, and restart the system.

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

4. Turn off the system and attached peripherals, and disconnect the system from its electrical outlet.
5. Remove the system-board assembly. See "Installing the System Board" on page 104.
6. Ensure that the controller card is firmly seated into the system board connector. See "Installing the Expansion Card" on page 79.
7. If you have a battery-cached RAID controller, ensure that the RAID battery is properly connected and, if applicable, the memory module on the RAID card is properly seated.
8. Verify that the cable connections between the SAS backplane(s) and the integrated storage controller are correct.

   Ensure that the cables are firmly connected to the storage controller and the SAS backplane board.

9 Install the system-board assembly. See "Installing the System Board" on page 104.

10 Reconnect the system to its electrical outlet, and turn on the system and attached peripherals.

If the problem persists, see "Getting Help" on page 131.

Troubleshooting Expansion Cards

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

NOTE: When troubleshooting an expansion card, see the documentation for your operating system and the expansion card.

1 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

2 Open the system. See "Opening the System" on page 58.

3 Ensure that each expansion card is firmly seated in its connector. See "Installing the Expansion Card" on page 79.

4 Ensure that the expansion-card riser is firmly seated in its connector. See "Installing the Expansion-Card Riser" on page 76.

5 Close the system. See "Closing the System" on page 59.

6 Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.

7 If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

8 Open the system. See "Opening the System" on page 58.

9 Remove all expansion cards installed in the system. See "Removing the Expansion Card" on page 77.

10 Close the system. See "Closing the System" on page 59.

11 Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.

12 For each expansion card you removed in step 9, perform the following steps:

a Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

b Open the system. See "Opening the System" on page 58.

c Reinstall one of the expansion cards.

d Close the system. See "Closing the System" on page 59.

Troubleshooting Processors

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

2 Open the system. See "Opening the System" on page 58.

3 Ensure that each processor and heat sink are properly installed. See "Installing the Processor" on page 66.

4 Close the system. See "Closing the System" on page 59.

5 Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.

6 If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

7 Open the system. See "Opening the System" on page 58.

8 Remove processor 2. See "Removing the Processor" on page 64.

9 Close the system. See "Closing the System" on page 59.

10 Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.

11 If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

12 Open the system. See "Opening the System" on page 58.

13 Replace processor 1 with processor 2. See "Installing the Processor" on page 66.

14 Repeat step 9 through step 11.

If you have tested both the processors and the problem persists, the system board is faulty. See "Getting Help" on page 131.

IRQ Assignment Conflicts

Most PCI devices can share an IRQ with another device, but they cannot use an IRQ simultaneously. To avoid this type of conflict, see the documentation for each PCI device for specific IRQ requirements.

Table 4-1. Assignment Specific IRQ Requirements

IRQ Line	Assignment	IRQ Line	Assignment
IRQ0	System timer	IRQ8	Real-time clock
IRQ1	Keyboard controller	IRQ9	ACPI functions (used for power management)
IRQ2	Interrupt controller 1 to enable IRQ8 through IRQ15	IRQ10	Available
IRQ3	Default for COM2	IRQ11	Available
IRQ4	Default for COM1	IRQ12	Available
IRQ5	Remote access controller	IRQ13	Math coprocessor
IRQ6	Reserved	IRQ14	IDE CD drive controller
IRQ7	Reserved	IRQ15	Available

Troubleshooting Changes in BIOS Settings

Certain changes in BIOS settings (such as chipset timing or latency, memory timing or latency, processor clock frequency, etc.) can cause a system to stop booting.

If you are able to enter the BIOS Setup by pressing F2, reset the BIOS to factory defaults by pressing F9. Save and exit the BIOS Setup.

If you cannot enter the BIOS Setup, clear the CMOS by following instructions given below:

1. Turn off the system. Do not unplug the power cord.
2. Open the system. See "Opening the System" on page 58.
3. Move jumper (J24) from the default operation position, covering pins 1 and 2, to the reset / clear position, remove the cover from pins 1 and 2.
4. Remove AC power and wait 5 seconds.
5. Move the jumper back to default position, covering pins 1 and 2.
6. Close the system.
7. Turn on the system.

The CMOS is now cleared and can be reset by going into BIOS setup.

NOTE: Removing the AC power before performing the CMOS Clear operation causes the system to automatically turn on and immediately turn off, after the procedure is followed and AC power is re-applied. If this happens, remove the AC power cord again, wait 30 seconds, and reinstall the AC power cord. Turn on system and proceed to the BIOS Setup Utility to reset the desired settings.

You may also need to perform a BIOS bank select after clearing the CMOS.

5

Jumpers and Connectors

Jumper Settings

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

System Configuration Jumper Settings

Figure 5-1. System Configuration Jumpers

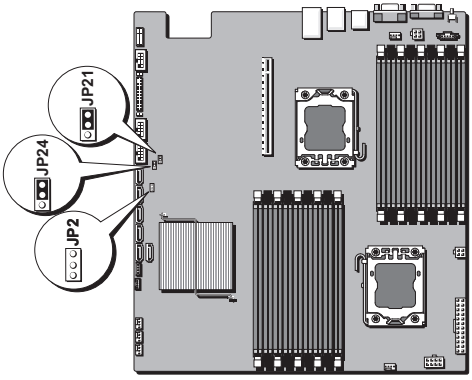


Table 5-1. System Configuration Jumpers

Jumper	Function	Off	On
J21	Password Setting	*Disable	Enable
J24	CMOS Setting	*Disable	Enable

Table 5-1. System Configuration Jumpers

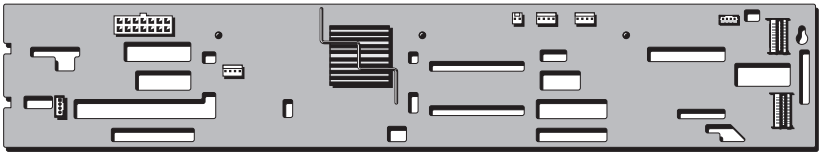
Jumper	Function	Off	On
JP2	iBMC Disable	*Disable	Enable

NOTE: The "*" in the table of system configuration jumpers describes the default status and the default state is not active state.

Backplane Jumper Settings

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

Figure 5-2. 3.5" Hard-Drive Expander Backplane



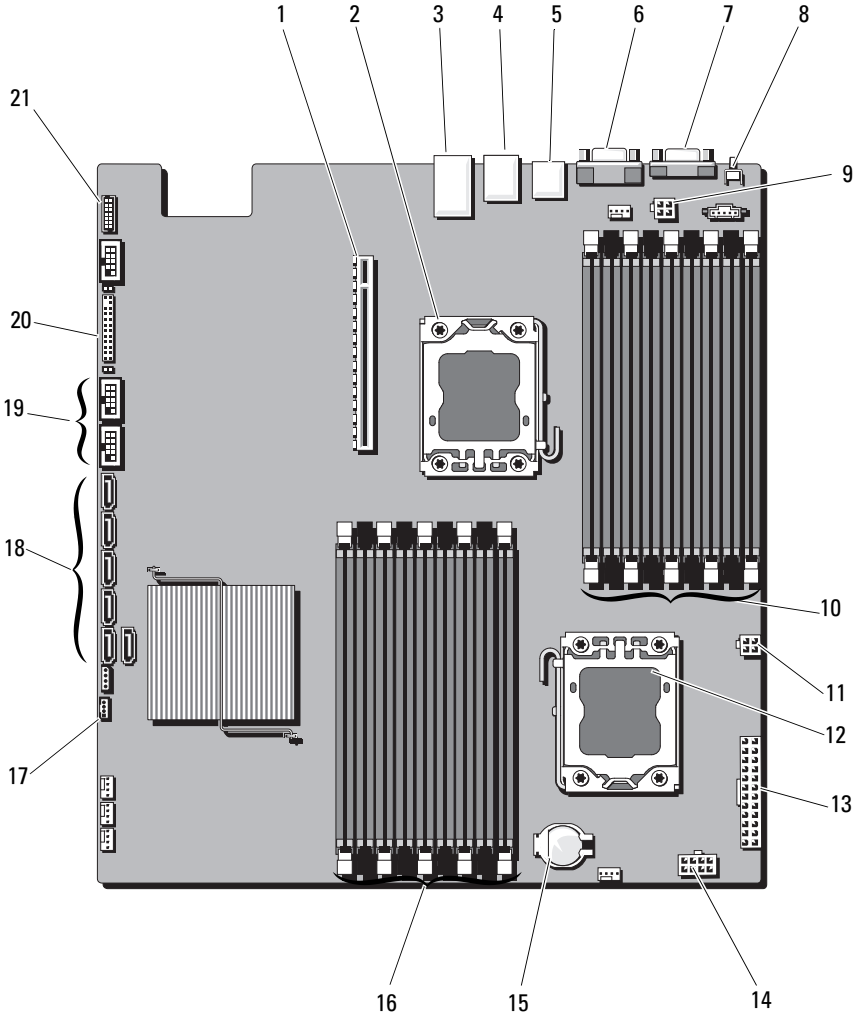
The function of the jumper installed on the expander backplane is shown below.

Table 5-2. Jumper Installed on Backplane

Jumper	Function	Off	On
J15	RAID Card setting	LSI Series	PERC Series

System Board Connectors

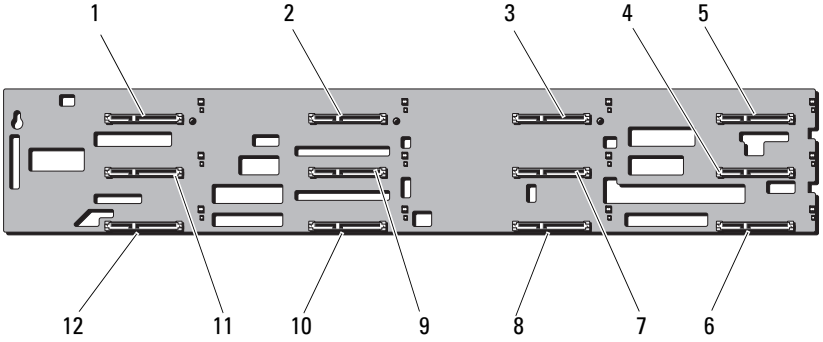
Figure 5-3. System Board Connectors



1	PCI-E card assembly connector	2	processor 0
3	Ethernet connector port	4	KVM over IP Port
5	back USB connectors	6	video connector
7	serial connector	8	system identification button
9	processor 0 power connector 1	10	DDR3 DIMM slots (for processor 0) (9)
11	processor 0 power connector 2	12	processor 1
13	main power connector	14	processor 1 power connector
15	system battery connector	16	DDR3 DIMM slots (for processor 1) (9)
17	IPMB connector	18	SATA connectors
19	front USB connectors	20	front panel connector
21	port 80		

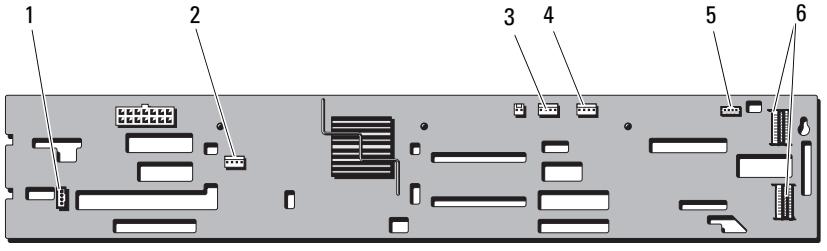
Backplane Connectors

Figure 5-4. Expander Backplane Connectors—Front View



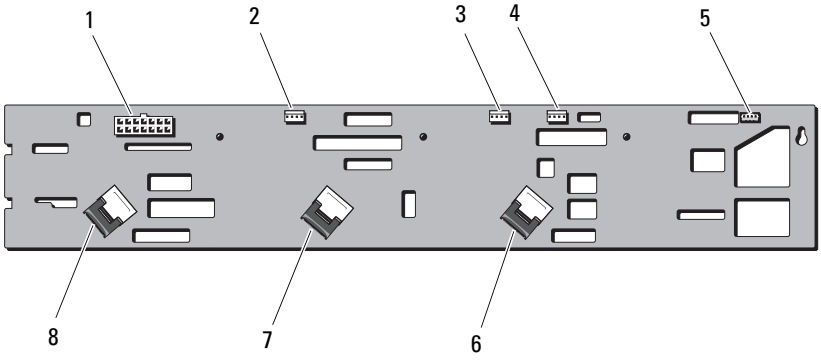
1	hard-drive 11 connector	2	hard-drive 8 connector
3	hard-drive 5 connector	4	hard-drive 1 connector
5	hard-drive 2 connector	6	hard-drive 0 connector
7	hard-drive 4 connector	8	hard-drive 3 connector
9	hard-drive 7 connector	10	hard-drive 6 connector
11	hard-drive 10 connector	12	hard-drive 9 connector

Figure 5-5. Expander Backplane Connectors—Back View



1	UART connector	2	fan connector
3	fan connector	4	fan connector
5	IPMB connector	6	mini-SAS connector

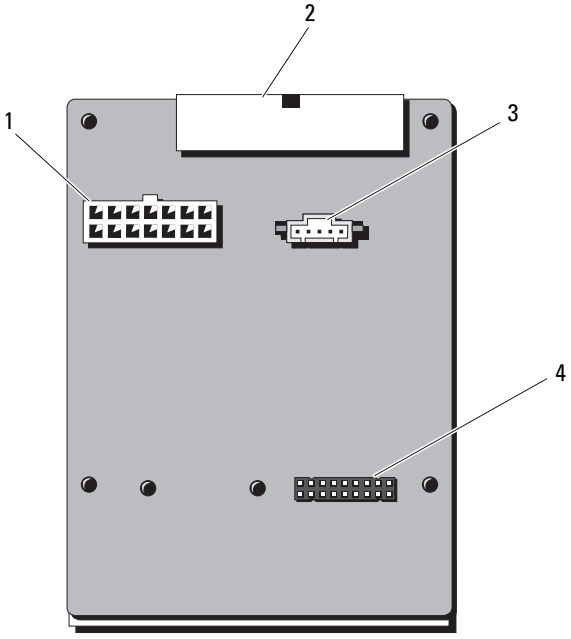
Figure 5-6. One-to-One Backplane Connectors



1	14-pin power connector	2	system fan2 connector
3	system fan 1 connector	4	PCI e fan connector
5	iBMC connector	6	SAS A2 cable connector
7	SAS B1 connector	8	SAS A1 cable connector

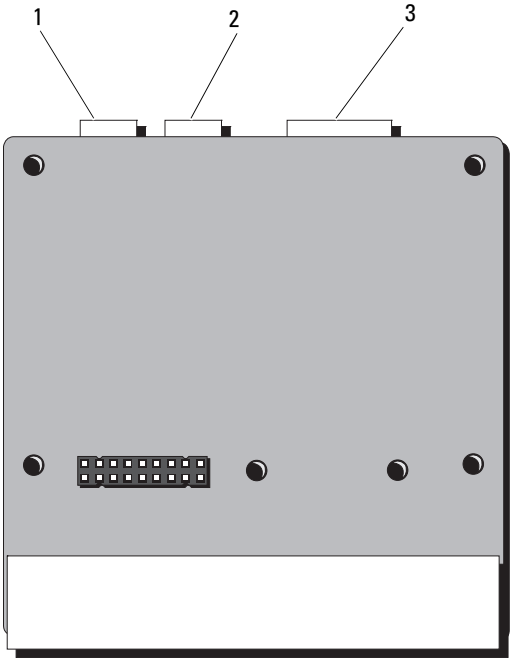
Power Distribution Board Connectors

Figure 5-7. Power Distribution Board 1 Connectors



1	14-pin power connector	2	24-pin power connector
3	5-pin PMBus connector	4	14-pin power connector

Figure 5-8. Power Distribution Board 2 Connectors



1 4-pin power connector

2 4-pin power connector

3 14-pin power connector

6

Getting Help

Contacting Dell

For customers in the United States, call 800-WWW-DELL (800-999-3355).

NOTE: If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog.

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

1. Visit **support.dell.com**.
2. Click your country/region at the bottom of the page. For a full listing of country/region click **All**.
3. Click **All Support** from **Support** menu.
4. Select the appropriate service or support link based on your need.
5. Choose the method of contacting Dell that is convenient for you.

Index

Numerics

10 GbE LAN Mezzanine Card, 87

10 GbE LAN Mezzanine card
- installing, 89
- removing, 87

A

about your system, 9

B

backplane
- installing, 99
- removing, 97

batteries
- troubleshooting, 112

battery
- troubleshooting the RAID card battery, 118

battery (system)
- installing, 101
- removing, 102

blank
- power supply, 92

BMC LAN
- configuring, 48

boot menu, 45

boot settings
- configuring, 45

C

closing
- system, 59

configuring
- BMC LAN, 48
- boot settings, 45
- IDE, 42
- memory, 42
- processor, 41
- remote access, 49
- super IO, 43
- USB, 43

contacting Dell, 131

control panel assembly
- installing, 101
- removing, 99

cooling fan
- installing, 95
- removing, 94

cooling fans
- troubleshooting, 114

cooling shroud, 60
- removing, 57, 60

D

damaged systems
troubleshooting, 112

Dell
contacting, 131

DIMMs
See memory modules (DIMMs)

E

exit menu, 50

expansion card
troubleshooting, 119

expansion cards
SAS controller, 80

expansion-card riser
installing, 76
removing, 74

F

features
back-panel, 14
front-panel, 10

G

guidelines
memory installation, 68

H

hard drive
installing, 56
removing, 54
troubleshooting, 117

Hard Drives
installing, 53

hard drives
installing, 53

heat sink
installing, 64
removing, 62

I

IDE
configuring, 42

indicator codes
hard-drive tray, 15
power and system board, 17

installing
10 GbE LAN Mezzanine card, 89
backplane, 99
control panel assembly, 101
cooling fan, 95
cooling shroud, 61
expansion-card riser, 76
hard drive, 56
heat sink, 63
memory modules, 72
power supply, 91
power supply blank, 92
processor, 66

SAS controller, 81
system battery, 101
system board, 104
system cover, 59

K

keyboards
troubleshooting, 108

M

memory
configuration, 70
configuring, 42
troubleshooting, 115
memory mode
optimizer, 69
memory modules
installing, 72
removing, 71
memory modules (DIMMs)
configuring, 68

N

NICs
troubleshooting, 110

O

opening
system, 58
optimizer memory mode, 69

P

PCI
configuring, 43
phone numbers, 131
POST
accessing system features, 9
power supplies, 90
power supply
installing, 91
power supply blank, 92
processor, 64
configuring, 41
installing, 66
removing, 64
processors
troubleshooting, 120

R

remote access
configuring, 49
removing
10 GbE LAN Mezzanine card, 87
backplane, 97
control panel assembly, 99
cooling fan, 94
cooling shroud, 57, 60
hard drive, 54
heat sink, 62

memory modules, 71
power supply blank, 92
processor, 64
SAS controller, 80
system battery, 102
system board, 103

S

safety, 107

safety Instructions, 51

SAS controller card
installing, 81
removing, 80

SAS controller daughter card
troubleshooting, 118

SAS RAID controller daughter card
troubleshooting, 118

security menu, 50

server menu, 47

start menu, 37

startup
accessing system features, 9

super IO
configuring, 43

support
contacting Dell, 131

system
closing, 59
opening, 58

system board, 103
installing, 104
removing, 103

system cooling
troubleshooting, 114

system cover
installing, 59

system features
accessing, 9

system setup
AMBIOS, 40
processor settings, 40
system memory, 40

T

telephone numbers, 131

Troubleshooting
External Connections, 122

troubleshooting
battery, 112
cooling fans, 114
damaged system, 112
expansion card, 119
external connections, 108
hard drive, 117
keyboard, 108
memory, 115
NIC, 110
processors, 120
SAS RAID controller daughter card, 118
sequence, 107
system cooling, 114

video, 108
wet system, 111

U

USB
configuring, 43

V

video
troubleshooting, 108

W

wet system
troubleshooting, 111